



TANGANYIKA

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

1952

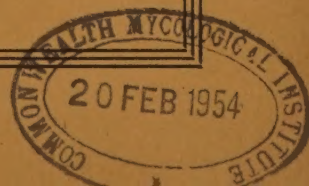
PARTS I AND II

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PARTS I AND II

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The Annual Report of the Department of Agriculture is divided into three Sections. Section I is concerned with agriculture in general, Section II with the work of the Department, and Section III which is published separately contains the annual reports of officers in charge of experimental stations, and of specialist officers.

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INTRODUCTION

AGRICULTURAL POLICY

The agricultural policy of Tanganyika remains that of developing cereal and other food crop production to the greatest extent possible up to the level of self-sufficiency, and at the same time increasing the export of the agricultural products mentioned in these pages. The African peasant cultivator and the Settlers of other races both produce grain crops, and both produce exports. Both need advisory services, and both demand assistance in the field of mechanization, whether it be for soil conservation or for the extension of the area under the plough.

As to the crops, it would be hard to find a country which had a greater range of temperate, sub-tropical and tropical crops, than those grown in Tanganyika. Notes upon these crops and the year's successes and failures are to be found in this Report, together with short accounts of the investigations carried out on them at Experimental Stations and in the Districts.

An increasing number of agricultural Boards having local authority in regard to cultivation and marketing is a sign of the times, but somewhat contrary to expectation, their establishment has not yet led to any substantial diminution in the demands made upon the resources of the Department of Agriculture. This will, no doubt, come in due course, but for the present these bodies need, if anything, more guidance in technical matters and more of the time of the senior experienced officers the further they develop their activities. There is again, a tendency for local associations to organize an increasing number of Agricultural Shows; a welcome development, but, nevertheless, needing attention from agricultural staff. Fortunately, the staff position is improving. A large proportion of the new entry is young and inexperienced, but the vacancies are now filling up. The prospects of bringing up to strength the practical and advisory services for the production of food and raw materials, the maintenance and restoration of soil fertility, the extension of cultivation into new areas and of other advances in methods and systems of cultivation, wherever they may be demanded, are improving.

WEATHER AND GENERAL REVIEW

Throughout the Territory there were heavy rains during the latter part of 1951 and the early part of 1952 but those areas, apart from the Southern Highlands, which depend upon some months of good growing weather from February or March for the majority of their crops suffered severely from the dry weather which prevailed from May onwards. Lake Province grain crops and rice crops in the Rufiji and elsewhere were seriously reduced by floods early in the year.

In the Lake Province the happy combination of early and ample rain and a successful campaign for early planting resulted in the largest crop of cotton ever harvested in the Territory. Sisal production reached record figures in spite of very dry conditions in the major growing areas and shipments of coffee, tea, dried cassava root, cashewnuts, sunflower seed, castor seed and a number of other products were on a larger scale than ever before.

Apart from dried cassava root, sales of foodcrops were on a much smaller scale than during 1950 and 1951, largely due to the failure or partial failure of so many native maize crops in the Tanga, Eastern, and Northern Provinces owing to the early cessation of the main rains. The Northern Province non-native maize growers fared better, owing to their custom of early sowing, and were able to market 1,000 tons more maize than in 1951. Farmers in this Province, as in many other parts of the country, suffered severe losses of small grains owing to unusually severe attacks by birds. African maize growers in the Southern Highlands Province made a very substantial contribution to the Territory's food reserves and bean crops in many areas were very satisfactory. The year ended with local shortages becoming apparent in many parts of the country, these having been accentuated by the virtual failure of the 1952/53 short rains.

World prices of the majority of export crops declined during the year from the very high levels of past seasons, but coffee was a notable exception and the very heavy harvests of the 1951/52 crop brought unprecedented prosperity to the native and non-native coffee growers of the Northern and Lake Provinces.

AFRICAN AGRICULTURE

High world prices for a wide range of products which can be grown by Africans have resulted in the marketing of record tonnages of a number of crops which were of minor importance only a few years ago. Notable examples are castor seed, sunflower seed, and cashew nuts. Of the crops which have figured prominently in Territorial exports for many years cotton was outstandingly successful in 1952, the record quantity grown by Africans providing a very necessary cash income during a year which was unfavourable for the staple grain

crops of the Provinces where cotton is widely grown. Only one Province, the Southern Highlands, had a really good season for maize and the sale of 18,000 tons by its African growers indicates that a very large acreage had been sown. From the Southern Province came a record harvest of cassava. Northern Province growers contributed a substantial tonnage of maize, only the Moshi District marketing less than in 1951. In the Eastern, Central and Tanga Provinces there were widespread failures of the maize crops and in the Lake Province the flooding of sorghum land early in the year seriously reduced the harvest. Rice harvests were good where crops were not damaged by early floods but owing to the widespread shortages of maize and sorghum a higher proportion than usual was consumed in the locality where it was grown and the paddy market figures were not representative of total production.

The association of growers into marketing societies and co-operatives is increasing. There was a rapid development of this movement among the coffee growers in Bukoba, and in the cotton districts of the Lake Province a large number of cotton collecting groups sprang up. These latter are without doubt the precursors of co-operative societies which will need much attention from officers fitted by their training in co-operative principles to guide them on the right lines.

The high monetary returns received from peasant agriculture have encouraged the more advanced growers in purchasing farming equipment.

In Sukumaland (Lake Province) there are now eight Ferguson tractors owned by Africans, these being hired out for ploughing at an acreage charge. It is thought that there are now some 5,000 ox-drawn digger ploughs, an increase of about 2,000 during the year, in the same district. Imported wheels and axles for making up into ox-carts also sold well. Elsewhere in the Territory the use of ox-drawn ploughs is increasing, ox-carts are beginning to be used in a few areas, and a few Africans own tractors.

The satisfactory progress of ploughing services provided for the use of African cultivators is reported under the heading "Mechanization".

Two other developments, though small ones may be regarded as straws in the wind. A few Africans have begun to grow pyrethrum and have received assistance from their neighbours the settlers. Similarly a few Africans have attempted with some success the growing and curing of bright tobacco. There was however a sharp decline in the output of native grown sisal. On a falling market the inferior quality of the hand prepared article was not attractive to buyers with the results that the output was much reduced towards the end of the year.

ESTATE AGRICULTURE

Sisal remained the major export crop of the Territory, and all but 5,497 tons of the Territorial production of 162,185 tons of line fibre and tow was the product of non-native estates. Production by estates was 23,229 tons greater than in 1951—representing an increase of over seventeen per cent.

The 1951/52 estate coffee crop was well above the average for recent years in the principal (Northern Province) producing area, where non-native production of mild coffee in parchment totalled 2,582 tons and, in addition, some 1,200 tons of dried cherry (hulled and unhulled) were marketed. The 1952/53 harvest, however, is estimated at no more than 1,200 tons of coffee in parchment. After such heavy yielding the previous season such a fall was to be expected.

Tea production continued to rise, many new plantings were made and planned and new factories in the Usambaras were in operation.

There were increased plantings of papaw during the year, prices remaining at a very profitable level and production of papain more than doubling as compared with 1951. The one sugar estate in the Territory which is equipped with a factory capable of producing plantation white (and brown) sugar increased its area under cane, extended the factory, and increased its output from 8,805 tons in 1951 to 9,666 tons in 1952. A very promising start was made by the Northern Province bean growers with the production for overseas canners of high quality haricots. The seed-bean growers had exported 1,200 tons of the 1951/52 seeds crop by the end of the year—with a further 400 tons awaiting despatch. Coconut growers had a very satisfactory harvest.

Weather conditions did not favour high yields of pyrethrum and tobacco but interest in these crops is unabated and although flue-cured tobacco production in the Southern Highlands was down from some 2,736,000 lb. in 1951 to around 2,290,000 lb. most farmers produced a higher percentage of bright leaf than in 1951. Although the total production of dried pyrethrum flowers was 240 tons as compared with 301 tons in 1951 Northern Province growers found that their pyrethrins percentages were back to normal as compared with the low values prevalent the previous year.

The only estate crop which showed a substantial fall in production was cotton, the growing of which by Indian and other planters in the Eastern Province was practically abandoned.

A notable example of estate production was the sale by Northern Province farmers, after a far from favourable season, of 1,000 tons more maize than in 1951. Wheat production, in contrast, appeared to be losing favour and the damage to this crop by grain-eating birds

was most discouraging. The Northern Province bean crop (including seed beans, haricots for export, and beans for consumption in the Territory) was referred to as "the most successful crop of the year" and farmers made a very substantial contribution to the Territory's supplies.

Reviewing the year from the standpoint of the farmer and estate owner it can be said that though climatic conditions were by no means ideal and the (not unexpected) fall in sisal prices may result in some of the marginal estates failing to pay their way the year was a reasonably prosperous one. For the coffee estates, whose harvesting of the 1951/52 crop was abnormally prolonged it was a very prosperous year indeed despite the perennial shortage of labour which affects Northern Province farmers.

MARKETING AND GRADING OF PRODUCE

The purchase of maize, wheat, white sorghum and paddy remained under Government control throughout the year, but mixed beans were de-controlled prior to the rains sowings. Prices were fixed for delivery at railhead, grain store or mill and controlled deductions were allowed to cover the cost of transport, and the service rendered, when buying was undertaken by authorized agents at village markets.

Wheat was purchased by grade in the Northern Province but other controlled food grains were accepted on a "fair average quality" standard. Weight penalties were imposed where maize with a moisture content exceeding thirteen per cent was offered, but owing to the dry weather at harvest little trouble was experienced on this score..

Purchases by the Department of Grain Storage during the year were as follows:—

			tons.
Maize	...	...	42,316
Sorghum	...	...	520
Rice	...	...	8,917 (hulled)
Mixed Beans	...	...	4,600

The basic prices paid for these food stuffs in 1951 and 1952 were as follows:—

		1951		1952
		Shs.		Shs.
Maize and white sorghum (unbagged)	...	28/80	...	30/30 per 200 lb.
Wheat—Grade I (unbagged)	...	45/33	...	Unchanged. (a)
Mixed beans (unbagged)	...	55/-	...	45/- per 100 kg. (b)
Paddy (Guaranteed minimum price at railhead) (unbagged)	...	40/-	...	42/50 per 100 kg. (c)

NOTES: (a) In the Southern Highlands 45/33 per 200 lb. was paid in 1951 and in 1952 for f.a.q. wheat at the Iringa mill.

(b) Mixed beans were decontrolled in September 1952.

(c) Paddy prices vary according to the distance of the producing area from Dar es Salaam. The prices quoted are for paddy produced in the Rufiji district and the Southern Province. The price was raised from 40/- to 42/50 in May, and a further increase, to 60/-, was made in September.

A guaranteed minimum price to the producer was given during 1952 for certain produce at the following rates applicable to railhead:—

					1951	1952
					Shs.	Shs.
Groundnuts (unbagged)	...	...	...	...	55/-	...
Sesame (unbagged)	...	...	...	...	55/-	...
						80/- per 100 kg. (a)
						80/- per 100 kg. (a)

NOTE: (a) The price of 80/- came into effect in May.

The Marketing of Cotton

Lint.—The Lint and Seed Marketing Board was responsible for the purchase and marketing of the cotton crop harvested in 1952. The Lake Province crop less 10,000 bales Mwanza had already been sold forward to the Raw Cotton Commissioner; the reserved 10,000 bales Lake Province lint was sold by auction in the free market by the Uganda Lint Marketing Board, Kampala, on behalf of the Lint and Seed Marketing Board.

The 1952 Eastern Province crop was sold entirely by auction in Dar es Salaam, the auctions being conducted by the Tanganyika Cotton Company Limited, acting as the Board's Managers.

The Northern, Tanga and Southern Provinces lint was put out to tender and the whole of the Northern and Tanga Provinces portion was sold in this way. The Southern Province crop, because tenders were not received, was auctioned in Dar es Salaam in the same manner as was the Eastern Province lint.

Cotton Seed.—All seed surplus to requirements for planting was sold at auctions held in Mwanza, for the Lake Province crop, and in Dar es Salaam, for the Eastern, Northern and Tanga Provinces crop.

Committee of Enquiry into the basis of ginners' costs and remuneration

The Cotton Board which customarily has the duty of reviewing the costs and charges to be allowed to the growers was unable to accept the Lake Province ginners' statement of the expenses they would incur in buying and ginning the 1952 cotton crop. The Board also considered that the basis of the ginners' remuneration needed re-examination in the light of present conditions in the industry. It therefore recommended that a Committee of Enquiry should be set up to examine the basis of ginners' costs and remuneration. Government accepted this recommendation, and a Committee consisting of

R. de S. Stapledon, O.B.E., Economic Secretary High Commission (*Chairman*)

H. Griffin-Smith, M.B.E., East African Office, London.

A. L. B. Bennett, O.B.E., D.F.C., Moshi,

started investigations in July, toured the cotton areas of the Lake and Eastern Provinces, and submitted its Report on 21st August, 1952. Copies of the Report can be obtained from the Government Printer.

The Marketing of Tobacco

(a) *Fire-cured*.—African-produced dark fired tobacco grown in the Southern Province was, as formerly, packed in the factories of the Ngoni-Matengo Native Co-operative Union and sold under the directions of the Songea Native Tobacco Board. Twenty Primary Societies buy the leaf from producers. Some fifty-five per cent of the produce was exported overseas and forty-five per cent purchased by East African cigarette factories. During the year losses on processing totalled 23·4%, of which 16·26% represented moisture—indicating acceptance of leaf from growers at somewhat too high a moisture content. The dark fired tobacco grown in the Lake and Western Provinces was, as formerly, disposed of through the Nyamirembe Native Tobacco Board to East African manufacturers.

(b) *Flue-cured*.—The bright flue-cured leaf grown in the Southern Highlands is graded and processed in the factory of the Southern Highlands Non-Native Tobacco Growers' Union Limited, a growers' organization with the Director of Agriculture on its Board of Directors. The crop is sold through the Union's agents, an established firm of tobacco brokers.

The Marketing of Pyrethrum

The pyrethrum crop is sold through the Joint East African Pool by the direction of the Tanganyika Pyrethrum Board. Growers receive a first payment according to weight on delivery at the Pool agents' premises; a second payment is made when the pyrethrin content of the consignment has been determined by sample analysis, and a final pay out is made when the year's accounts are closed.

The Marketing of Coffee

Considerable changes took place in coffee marketing arrangements during the year. African growers on Kilimanjaro decided to enter into no further contract with the British Ministry of Food and the Kilimanjaro Native Co-operative Union in association with the Arusha African Farmers' Co-operative Society and eight primary co-operative societies formed the Tanganyika Co-operative Trading Agency Ltd., which arranged for the sale of the bulk of the African mild coffee crop at auctions held in Moshi. The Meru Native Coffee Growers' Association, however, decided to sell their small crop (around 235 tons in 1951/52 but expected to be small in 1952/53) to the British Ministry of Food at a fixed price. The non-native coffee growers of the

Territory, represented by the Tanganyika Coffee Growers' Association, decided to sell 1,000 tons of their produce to the British Ministry of Food at a fixed price and to auction the remainder at the Kenya coffee auctions in Nairobi. Auction prices in late 1952 were around £450 per ton and the guaranteed price to be paid by the British Ministry of Food for the 1952/53 crop is £370 per ton. As regards the 1951/52 crop the British Ministry of Food made a supplementary payment of £70 per ton to those who continued contractual agreements.

The Bukoba "native" and "plantation" coffees, representing Robusta and Arabica respectively and grown almost exclusively by Africans, were, as previously, sold under the directions of the Bukoba Native Coffee Board. The crop is purchased by primary co-operative societies and licensed buyers, who deliver the coffee, largely in the form of dried cherry, to zonal agents of the Board. It is hulled, cleaned and prepared for export in two main curing works from which it passes to the Coffee Grader; after grading it is despatched to Mombasa where it is sold by auction. The 1951/52 crop was sold in part to the British Ministry of Food at a contract price but the contract was not renewed after its expiry in June, 1952.

PRODUCTION COMMITTEES

These Committees, set up under the Crops (Increased Production) Ordinance, have a membership largely drawn from the non-native farming community which they serve. Committees continued to operate in the Arusha, Moshi, Mbulu, Morogoro, Iringa, and Kilosa non-native farming areas.

They discussed many matters of urgent importance to their community and brought their views to the notice of Government by means of minutes submitted to the Director of Agriculture. The Production Committees were also able to solve many local farming problems by direct approach to local officials and others.

One of the main functions of the Committees is to advise the Director of Agriculture as to the eligibility of farmers for payments under the Crops (Increased Production) Ordinance in respect of certain food-crops. These payments, known as "guaranteed minimum returns", are designed to encourage non-native farmers grow the basic foods of the Territory in quantities which permit the sale of a substantial surplus to the Department of Grain Storage or its agents. They take the form of payments (up to a fixed maximum for total crop failure based on the estimated average cost of seed and cultivation, etc.) which are made to farmers whose yields have been seriously reduced by causes not within their power to control. During 1952 there were considerably more failures and partial failures of crops than during the previous year, due to mal-distribution of rains and exceptionally severe

damage to wheat crops by birds. A total of some £8,500 was required to meet claims for the 1952 season but it is satisfactory to note that in the main non-native maize growing area (the Northern Province) farmers sold 1,000 tons more maize to the Department of Grain Storage than in the previous year, in spite of the difficulties of the season. The guaranteed minimum return system may be given substantial credit for this result.

The Committees performed another useful function in advising the Land Bank of Tanganyika concerning the stability of farmers applying for short and long-term loans.

VERMIN, INSECT PESTS AND DISEASES

Even in the best of years the losses of food and other produce which result from attack by vermin, pests and diseases are very substantial in all countries, such as this, where vast tracts of unsettled land adjoin the cultivated areas and where the use by the majority of cultivators of preventive measures and of insecticides and fungicides is exceptional. Only among certain non-native farmers and planters, and among the native growers of coffee in the Northern Province, is there to be found a real understanding of the value of pest and disease control measures. The control of vermin is an unending battle in many parts of the Territory and is likely to remain so until the country is more closely settled.

Grain-eating birds cause some losses to wheat, sorghum and rice growers every year. In 1952 the damage was widespread in the Lake, Central, Eastern and Northern Provinces and caused very serious losses. Three thousand acres of sorghum were destroyed on Overseas Food Corporation farms at Kongwa and several hundred acres of wheat were lost or seriously damaged in the Northern Province. Losses of native grains cannot be accurately estimated but are known to have been considerable.

The chief species concerned are three types of weaver of which the Sudan Dioch (*Quelea quelea aethiopica*) is probably the major pest. These weavers nest in dense colonies and form enormous swarms after the breeding season. There is evidence that breeding is favoured by years of good rains, particularly by such good early rains as in 1951/52.

The swarms migrate from the nesting areas, sometimes for considerable distances, to non-breeding feeding areas where they attack all small grain crops. The birds particularly favour grain in the milk or early dough stage, causing greater loss than if ripe grain were taken.

During the non-breeding season the swarms roost densely packed in well defined areas and elsewhere have been largely controlled by blasting at night. This method has been tried successfully in Tanganyika on a small scale in a dense nesting colony, but it is expensive.

There is little exact information on the breeding areas, migration routes and roosting habits in Tanganyika and investigations have been started. Cheaper methods of control than blasting are under trial. There is a possibility that in 1953 the number of these pests may be very much reduced as a result of the failure of the early rains.

The comparatively dry weather during the latter part of 1952 discouraged plant diseases, and none have been unusually severe.

Panama disease has spread during the year from the Moshi District to the lower areas in the Same (Pare) District and is suspected near Korogwe and Muheza. Field staff have been trained and equipped for dealing with outbreaks. Many banana varieties are being tested on infected land for eventual assessment of their susceptibility or resistance to the disease. To date, three varieties, one of which is uncommon, have been found to be highly susceptible.

The Bacterial blight of peas which was locally very destructive in 1951 appears to have been checked by the dry season. It spread to the Southern Highlands Province in 1952, but affected only the early sown crop.

Maize stalk-borer (mainly *Busseola fusca*) caused widespread damage in nearly all parts of the Territory. "Close season" for maize and sorghum, the issue of D.D.T. dust for treating individual plants, the destruction of perennial sorghums formerly used for boundary-marking, the destruction of badly infected maize and the destruction or composting of crop residues are means of control which have been attempted but nowhere can it be said that campaigns against the pest have achieved any appreciable success.

The following paragraphs on pests, diseases and vermin in the Provinces omit further reference to grain-eating birds and maize stalk-borer.

From the Northern Province it is reported that white stem-borer in coffee remains a serious problem, but that the campaigns conducted by the Moshi Native Coffee Board were very successful and have now been supplemented by the use of a mixture of ethylene dichloride and carbon tetrachloride. Many estates and native growers used a D.D.T. emulsion for the control of *Antestia*, which is still the major pest of coffee. In co-operation with the Department's entomologist a large field of seed beans was successfully sprayed by an aircraft of the Colonial Insecticide Research Unit for the control of American boll-worm which caused much damage to this crop in 1952.

In the Tanga Province damage by pests and diseases was negligible in comparison with the losses of crop as a result of insufficient rain, but the depredations of vermin in the Handeni District were more severe than usual owing to the shortage of wild foods occasioned by the inadequate rains.

In the Lake Province blackarm and boll rot, and to a lesser extent *Helopeltis*, affected cotton crops. Bollworm caused considerable loss in chickpea crops.

The Eastern and Central Provinces suffered from the usual attacks by pig, baboon, hippo, and other vermin, but some very successful poisoning campaigns were conducted against pigs, baboons and monkeys and much assistance was given by the Game Department in controlling elephants and hippopotami. Damage by African bollworm to cotton and other crops was less than in recent years, though there were exceptionally severe localized outbreaks of this and the pink bollworm.

In the Southern Province there were heavy losses of sesame and pulse crops due to flea-beetle and aphid attack.

Losses due to pests, diseases and vermin in the Southern Highlands were not exceptionally heavy, but took their usual toll.

In the Western Province outbreaks of red locust are always a possibility, but in 1952 the Red Locust Control Service kept this pest under control in the areas where such outbreaks tend to originate.

Stalk-borer of maize and sorghum, American boll-worm in cotton and seed beans, stem-borer in coffee, sucking-bug in beans and the problems of grain storage have received particular attention from the Department's Entomologists during the year. The Empire Cotton Growing Corporation's Entomologist, working at the Ilonga Agricultural Station, made considerable progress with experimental control of the American boll-worm by insecticide dusting. At the Sisal Research Station work continued on the use of systemic and other insecticides for the control of sisal weevil; and a number of deficiency diseases were investigated. At Ukiriguru one of the major objectives of the cotton breeding programme is to combine with other desired characteristics a substantial degree of resistance to jassid and bacterial blight. Resistance to jassid has, in fact been successfully achieved in the strain now used throughout the Lake Province. The Department's Plant Pathologist has paid much attention to Panama Disease of Bananas. The reports of the specialist officers and experimental stations concerned are printed in Section III of this Report.

MAIN CROPS

SISAL

There was a further substantial increase in the production of sisal (line fibre and tow) by estates, whose total area under sisal at the end of 1952 was estimated at over 568,000 acres. The sisal crop is of the greatest importance to the economy of the territory and the impressive total of 162,185 tons is the "record" production. The greater part of this output was the result of large-scale plantation enterprise but a

small quantity was grown by Africans. Included in the tonnage shown in the table below are 5,297 tons of sisal produced by Africans from boundary-hedge plants, this representing a decrease of over forty per cent in African production as compared with 1951. Nearly eighty-one per cent of Territorial production was in the form of line fibre, the remainder being tow and unexportable fibres.

Weather conditions were far from favourable in the principal growing areas, there being insufficient rain in the Tanganyika Eastern and Southern Provinces. A wind of cyclone type caused some damage to sisal in the Southern Province.

Market quotations (per ton, c.i.f.) for No. 1 Grade line fibre during the year rose from £213 to £240 during February, remained steady until April, but then declined sharply during the next five months to £100. During October and November there was some recovery and the year ended with the price at around £105. During 1951 quotations had ranged between £213 and £225 per ton c.i.f. for the same grade. The effect of the year's lower prices was to make it doubtful whether some of the newer estates on marginal land would continue to pay their way, but established estates on average sisal land continued to prosper. Much of the sisal exported during the year was in fulfilment of long-term sales contracts and the prices realized were frequently higher than the prevailing market quotations. The Tanganyika Sisal Growers' Association quotes the figure of £117 as being the average f.o.b. value to the growers of all grades of line fibre and tow exported during the year. In 1951 the figure was £166 while in 1950 it was under £100.

The report of the Sisal Research Station, Mlingano, is printed in Section III of this Report, and a summary appears in Section II.

The following figures show the production, export, and export value of line fibre and tow during the last five years.—

Year		Production		Exports		Value (Exports)
		Tons		Tons		£
1947	...	105,552	...	95,856	...	5,469,443
1948	...	120,622	...	117,092	...	8,934,461
1949	...	123,296	...	132,514	...	11,111,232
1950	...	121,598	...	118,909	...	11,846,057
1951	...	145,223	...	142,106	...	23,689,454
1952	...	162,185	...	156,167	...	21,708,053

COFFEE

Milds

The results of the 1951/52 mild coffee crop, that is the coffee prepared by the wet pulping process from *Coffea arabica*, were very satisfactory and amounted to 7,359 tons (hulled) as compared with 6,205 tons (hulled) the previous season. This crop is made up largely of the Northern Province coffee which is grown by African peasants and

by non-native planters in the proportion of five to two. Included in the total are small quantities from the Southern Highlands and elsewhere. In addition to the quantity stated it is necessary to report the sale of some 1,200 tons of coffee prepared by sun-drying which is not strictly speaking mild coffee, this method of preparation having been forced upon some growers by the absence of sufficient labour to pick the heavy crop.

The arabica tree is well known for its biennial bearing habit. It is no surprise therefore to find that the prospects for the 1952/53 crop are not so good when in addition the poor rainfall of the season is taken into account.

The standard of maintenance, no doubt due to the satisfactory prices received, has improved. New plantings have been made and many plantations have extended the area under coffee.

Hamilea vastatrix occurred as usual early in the year but apart from that outbreak the season was notably free from attacks by pests and diseases and good work was done in many areas against infestation by the coffee stem-borer.

Hards

The hard coffee crop, so called from the rather rough flavour which attaches to coffee prepared by sun-drying the cherry, is the important crop in the Bukoba District. It is chiefly derived from Robusto coffee but a smaller quantity of Arabica coffee is grown, both almost entirely by African producers. The quantities graded for export in 1952 totalled over 9,000 tons, being 6,917 tons "Native" and 2,205 tons "Plantation" (the trade terms for these coffees). The total was an advance upon the 1951 figure of 9,148 tons and indicates the beginning of what is expected to be a substantial increase in the crop. The Bukoba Native Coffee Board maintain a series of coffee nurseries for providing a satisfactory source of supply of well grown transplants and endeavours to extend both the planting of coffee and the maintenance of good standards of cultivation among these trees already in bearing. The Board's plans for the establishment of a network of hulling factories for dealing with the crop on a zonal basis have been for the present suspended while plans are being laid for a large scale trial between a factory equipped to winnow and grade hand-hulled coffee and a factory for dealing with dried cherry (including the hulling, winnowing and grading process). There was a great advance in the co-operative movement during the year and a large proportion of the crop is now sold through primary societies.

The report of the Coffee Research Station, Lyamungu, is printed in Section III of this Report, and the report of the Entomologist, Lyamungu, in the same Section is concerned mainly with coffee pests. Work at Lyamungu and the small Mbosi and Bukoba sub-stations is

mentioned under the heading "Agricultural Stations and Experimental Work" in Section II. Reference to coffee will also be found in the Northern Province and Lake Province summaries in Section II.

COTTON

The Territorial cotton crop was a record one, the total being estimated at some 77,800 bales of lint. The harvests in both the Lake and Eastern Provinces showed very substantial increases, the Lake Province crop being the largest on record. Although the raising of the producer-price for the season undoubtedly resulted in the planting of larger acreages in nearly all growing areas the increase in the Lake Province crop from 42,000 bales in 1951 to 71,000 bales during the year under review was due more, it is thought, to a combination of other factors—these being early and ample rains, successful campaigns for the encouragement of better land preparation and earlier sowing and weeding, the extension to the whole Province of the Ukiriguru seed issue UK. 46, and freedom from severe damage by pests or diseases. The most potent single factor in obtaining a good crop of cotton is of course early planting and provided that the weather is suitable much can be done, as in the year under discussion, by exhorting the cultivator to bestir himself in good time. The present baleage figure is the result largely of good work done by the Field Officers and the Agricultural Instructors on these lines.

In the Eastern Province, production by non-native growers fell sharply as a reaction to the discontinuance of permission for such growers to deliver ungraded seed-cotton to the ginneries. Native deliveries, in contrast, were some three times the 1951 figure—this increase being attributable to the stimulating effect of the higher producer-price, a better season (in spite of localized thunderstorm and pink bollworm damage), and perhaps, in small part, as a result of there being no opportunity to dispose of ungraded cotton through non-native planters.

Small tonnages of cotton were grown in the Southern, Tanga, and Northern Provinces. In the Southern Province interest was still declining in the coastal areas, and a poor crop from Tunduru was due to late planting. In the Northern Province the planting of greater acreages resulted from the increased producer-price, but climatic conditions were unfavourable and the crop was smaller than in the previous year. In the Tanga Province the crop was also smaller, this being attributed to a concentration of interest on food crop production, and to unfavourable weather.

The planting season in the Lake Province begins in December but weather conditions during the latter part of 1952 were unfavourable for cotton planting and the 1953 cotton crop prospects—so far as can be

judged before the end of the planting season—are by no means good because the necessary early plantings cannot be achieved.

Other aspects of cotton production are dealt with in Section III of this Report (containing the Progress Reports of the Empire Cotton Growing Corporation for the Season 1951/52 and Annual Report of the Ilonga Agricultural Station for 1952), these Reports are summarized in Section II, a note on the Lint and Seed Marketing Board's cotton marketing arrangements appears in Section I, and in Section II some aspects of cotton production are touched on in the "Provincial Summaries".

The production of lint in recent years is given in the following table:

<i>Province</i>	1940-49 (Average)	1949	1950	1951	1952 (estimated)
Lake ...	35,122	37,361	38,905	42,349	70,750
Eastern ...	9,786	12,579	8,433	3,047	6,300
Northern ...	1,253	398	1,356	1,923	646
Tanga ...	1,010	668	849		
Southern ...	755	304	172	145	179
Total...	<u>47,926</u>	<u>51,310</u>	<u>49,715</u>	<u>47,464 (a)...</u>	<u>77,875</u>

(All in bales of 4,000lb)
(a) Revised

COPRA

In the Tanga Province production was normal, though nut yields were tailing-off towards the end of the year. Excellent yields were obtained in the Eastern Province and although in the Southern Province many thousands of palms were felled by a destructive high wind crops were otherwise satisfactory.

Copra prices in the Tanga Province varied widely, the range being from Shs. 7/50 to Shs. 20/- per frasila, with local mills paying up to Shs. 16/- for the best kiln dried products. Interest in kiln-drying has undoubtedly been stimulated as a result of the kilns which were built by the Department at Gombero, and which, after being handed over to the Native Authority as a going concern, are now operated by a native Co-operative Society numbering 108 very keen members. Four kilns were built by non-native growers during the year, and there is evidence that groups of native growers are contemplating building other such kilns—which are cheaply made and fired with coconut shells.

Much attention has been paid during the year in the Tanga and Eastern Provinces to grove sanitation. Well over eighty per cent of the dead and dying palms in the Tanga District—for so long a harbouring place for pests—having been dealt with during the year and the Muheza area is now virtually one hundred per cent clean. The Government coconut plantations in Tanga continue to be cleaned up, 900 acres

are now free from bush, 8,000 dead and dying palms cut and stacked for burning and two copra kilns in operation. Both in the Tanga Province and the Eastern Province it is found that constant pressure on both native and non-native growers is required in order to maintain grove sanitation, but considerable success has been achieved. It has been observed that the growing of cassava in coconut groves results in good yields from both crops.

The Government plantations in Tanga are under the charge of the Veterinary Department for convenience of management combined with milk production but five plantations in Bagamoyo and two in Mafia are maintained by the Department of Agriculture and the bulk of their produce was marketed as kiln-dried copra. There was a keen demand for seedlings from the Department's nurseries in Tanga, Pangani, and Bagamoyo.

The coconut planting Bonus Scheme, described in last year's report, got under way during 1952—nine growers in the Tanga Province receiving initial payments totalling Shs. 17,530 and a group of growers in the Eastern Province planning to claim bonus for a communal plantation. A further twenty-eight initial claims are expected from the Tanga Province in 1953.

The following table shows recorded copra marketing during the last few years. Actual production was considerably greater.

		Tons							
<i>Province</i>		1948		1949		1950		1951	1952
Eastern	...	4,764	...	9,388	...	5,508	...	3,991 (a)	9,988
Tanga	...	2,879	...	5,147	...	4,557	...	3,518	4,081
Southern	...	625	...	1,751	...	943	...	1,076	824
Total		8,268	...	16,286	...	11,008	...	8,585	14,893

(a) Excluded estate production.

CASSAVA

Although cassava is deficient in protein and is therefore less of a complete food than the grain and pulses it has the advantage over nearly all other food crops in that it will survive droughts or locust damage causing total failure of grain-crops. In many parts of the Territory cultivators need no encouragement to grow the crop, in fact it seems likely that they will have to be taught to grow a more varied diet, but there are other areas subject to periodic grain-crop failures where the local Native Authorities have, for many years past, found it necessary to have rules requiring the planting of a certain minimum acreage of cassava each year. The Department co-operates in many ways in the annual campaigns for increased planting. Cassava yielded well during 1952.

In the Eastern Province cassava is a staple food crop in Uzaramo and the southern part of the Bagamoyo District, and the extension of the crop to the plains areas of Morogoro, Kilosa, and Ulanga continues—the hill-dwellers already growing it in quantity. In the Kilosa District sufficient planting material has now been propagated to enable every taxpayer to establish a one-acre plot early in 1953.

In the Kondo District of the Central Province very large areas are now under cassava, and elsewhere the acreage has been considerably extended, first by means of communal plots and now by issues of planting material to individual growers. The communal plots are now being used largely for building up stocks of mosaic-resistant types.

In the Tanga Province planting in the coastal areas was satisfactory—apart from one district where, failing the receipt of their usual annual instructions to plant cassava, the cultivators were inactive. Elsewhere in the Province the presence of a considerable acreage of cassava as a result of planting campaigns in recent years was particularly valuable during this year of poor grain harvests. The Northern Province grows little cassava.

Very large quantities of cassava were harvested in the Southern Province, mainly from the Newala District. It is thought that when other districts are growing sufficient for their own needs it would be best to discourage production in the Newala District to some extent, to avoid the undesirable effects of virtual monoculture and to ensure a more varied diet. The Province exported some 17,000 tons of dried root the bulk to the British Ministry of Food, at prices which stimulated production. Export was suspended at the end of the year owing to dry weather endangering the 1953 grain crops.

In the Western Province the area under cassava was greater than in the previous year due in part to past campaigns to increase production and in part to the fact that growers are now receiving between fifteen and twenty-two cents per kilo for the dried root, at which price the cash yield per acre compares favourably with that of other crops. A substantial tonnage of Western Province root is now consumed in Dar es Salaam, and there were also overseas exports.

The Southern Highlands Province had excellent crops, and there was no relaxation in the campaign to increase planting. In Rungwe cassava has become a popular food.

Virus-resistant varieties originally raised at Amani are now undergoing trial in many districts and there is every likelihood that some of these varieties will replace susceptible clones now used by native cultivators. Reference is made to yield trials of varieties from Amani in the note on the Agricultural Station, Mahiwa, which appears in Section II, and in the Annual Report of the Botanist in Section III of this Report.

The following table shows the recorded marketing of cassava in recent years. The tonnage of root actually grown was many times these figures:—

<i>Province</i>	<i>Marketed Tonnage of Dried Root</i>					
	1949		1950		1951	1952
Southern ...	6,041	...	1,252	...	8,894	26,000
Western ...	2,380	...	1,751	...	2,340 (a)	3,150
Eastern ...	523	...	19	...	112	127
Central ...	—	...	—	...	31	—
Lake ...	256	...	30	...	17	—
	<u>9,200</u>	...	<u>3,052</u>	...	<u>11,394 (a)</u>	<u>29,277</u>

(a) Revised figures.

CASTOR SEED

Production of this crop in the Eastern, Central, Southern, Tanga, and Northern Provinces again showed a substantial increase, and there was some increase in production elsewhere. Growers received prices as high as £55 per ton for castor seed at the coast. It is now clear that castor requires moist and fertile land if it is to be profitable on a field scale, and such land is generally required for food crops. Castor is, however, a very suitable crop for growing in small pockets of rich soil such as are found around the majority of dwellings and cattle pens. Native Authorities are discouraging the cultivation of castor among food crops as it has been found that the yields of the latter are seriously reduced by the competition.

There is no local use or processing of castor seed, the whole crop being exported overseas. The following table shows recorded marketings of the seed during recent years, but the table of exports forming an Appendix to this Report is a better guide to total production:—

<i>Province</i>	<i>Tons</i>					
	1949		1950		1951	1952
Eastern ...	690	...	1,046	...	820	1,664
Central ...	333	...	652	...	1,621	2,823
Southern ...	54	...	151	...	374	609
Southern Highlands ...	—	...	—	...	600	635
Tanga ...	—	...	111	...	400	400
Northern ...	—	...	30	...	100	1,108
Western ...	—	...	—	...	10	—
	<u>1,077</u>	...	<u>1,990</u>	...	<u>3,925</u>	<u>7,239</u>

CASHEWNUTS

Production in the main growing area (the Southern Province) was nearly double that of 1951, while in the Eastern Province the increase was nearly as great. A small processing factory operates in the Dar es Salaam area, and plans are well advanced for the erection of a larger one in the Southern Province. There is increasing non-native interest in planting this crop. Owing to the lack of processing facilities the nuts have for many years been exported to India where the kernels are

packed for sale to (largely) the U.S.A. and the shell-oil is extracted for industrial use. The quality of the nuts shipped from Tanganyika is sometimes inferior to the exports from other producing countries, owing to lack of cleaning and grading, and failing action by exporters themselves it may prove desirable to introduce compulsory submission for inspection at the port.

Reported sales by growers during 1952 and previous years were as below, but it is known that these figures do not represent total production. Reference to the Table of Exports (forming an Appendix to this Report) will give a better indication of Territorial production. The exports in 1952 amounted to 11,506 tons.

Recorded sales by growers (in tons)										
Province	1947		1948		1949		1950		1951	1952
Eastern ...	348	...	661	...	444	...	1,117	...	1,073	1,745
Southern ...	1,312	...	4,533	...	3,276	...	4,787	...	5,308	9,064
Total ...	1,660	...	5,194	...	3,720 (a)...	...	5,904	...	6,381	10,809

(a) A year of low rainfall resulted in poor crops.

GROUNDNUTS

Apart from the Southern Province, where losses due to fungus and virus diseases were widespread, yields in the main growing areas were very satisfactory and there was further evidence of the stimulating effect on native production of the 1951 producer-price increase.

Reported sales by growers (excluding the Overseas Food Corporation) during 1952 and previous years were as follows:—

<i>Province</i>		1950		Tons		1952
Western ...	...	475	...	1,301	...	5,461
Central ...	...	383	...	1,183	...	2,590
Lake ...	...	296	...	1,051	...	2,199
Southern ...	...	21	...	990	...	632
		1,175	...	5,525 (a)	...	10,882

(a) Revised total.

MAIZE, SORGHUM, AND MILLET

The abnormal distribution of rainfall during the cropping season was largely responsible for an over-all fall in Territorial production of the grain crops as compared with the heavy crops of 1950 and 1951, but wherever weather conditions were favourable excellent crops were harvested.

In the Northern Province non-native farmers grew nearly 1,000 tons more maize than in 1951, the early cessation of the main rains having no adverse effect on their crops—which are almost invariably early planted—and the dry conditions during ripening and harvest resulting in negligible losses from the normally somewhat damaging pink ear-rot. African growers, who often make two or more sowings, suffered

substantial losses of crop from the later ones. Sorghums and millets are not extensively grown in the Province. Yields were somewhat reduced by the dry conditions prior to harvest.

Throughout the Tanga Province the maize crop was poor, losses of late-1951 sowings being caused by excessive rain and the main sowings suffering severely from the early cessation of the main rains. Conditions in the Handeni and Pare Districts were particularly unfavourable. Non-native maize growing is not on a large scale in this Province and yields (other than in the Luengera Valley where conditions were more favourable) were generally low. Sorghums and millets are grown to a limited extent in the Province and owing to dry conditions in the Handeni District and damage by birds in other areas yields were not good.

The Lake Province sorghum crops suffered severely from excessive rain at planting time, especially in central Sukumaland. Maize is a less important crop in many parts of this Province than elsewhere in the Territory but a considerable acreage is grown in North Mara where yields were satisfactory.

Short rains crops in the Eastern Province were good, but the main long-rains sowings suffered severely from the dry conditions which prevailed from May onward. Sorghums and millets, which are not grown extensively, suffered somewhat from bird-damage.

In the Central Province sorghums and millets gave poor yields, due to dry spells early in the year and, in the Singida and Kondoa Districts, to the crops maturing during an exceptionally wet period. Large flocks of grain-eating birds ravaged many fields. Maize is not very extensively grown in the Province, but such sowings as were made yielded well.

Western Province yields of both sorghums and maize were seriously reduced by heavy infestations of stalk-borer—a pest which has been increasingly in evidence in the Province during recent years. The Eleusine (finger-millet) crop was considerably larger than in recent years, a substantial tonnage being marketed by growers.

Weather conditions in the Southern Province were unfavourable for grain production, dry spells during the growing season being followed by heavy rain-storms and high winds. There was some reduction in the planted acreage in this Province, due no doubt to the greater attraction of profitable export crops.

In the Southern Highlands heavy crops were harvested, and there has been a considerable extension of the acreage under maize, the African cultivator being largely responsible for this advance.

The rust (*Puccinia polysora*), which recently reached East Africa, has been recorded from the Moshi, Kilosa, Muheza and Tanga districts, and probably has a wider distribution. So far there have been no reports of serious losses of crop.

The following table shows the recorded tonnage of maize and sorghum marketed by growers in 1951 and 1952. This represents only a small fraction of the total harvests.

Province			1951		Notes	1952		Notes
			Marketed Tonnage			Marketed Tonnage		
Northern	...	...	28,515	...	All maize (11,584 tons non-native grown)...	21,223	...	All maize (12,518 tons non-native grown).
Tanga	...	...	3,180	...	All maize (Handeni District) ...	566	...	All maize (Handeni District)
Eastern	...	...	11,447	...	Chiefly maize (3,830 tons non-native grown)	3,278	...	Chiefly maize (477 tons non-native grown)
Central	...	...	646	...	Chiefly maize ...	170	...	Chiefly sorghum.
Western	...	...	4,293	...	Chiefly maize	2,770	...	Chiefly maize.
Lake	...	...	5,016	...	Not specified ...	2,633	...	Not specified
Southern	...	...	5,279	...	Included 2,542 tons maize.	1,000	...	Chiefly maize.
Southern Highlands			9,790	...	All maize ...	17,844	...	All maize.
Total			...	68,166 (a)		49,484		

(a) Revised total.

The following table shows the recorded tonnage of maize marketed by growers in recent years. This represents only a small fraction of the total harvests:—

		Tons
1949	...	20,952
1950	...	64,473
1951	...	56,214
1952	...	42,316

ONIONS

The crop in the Northern Province was an average one.

The Department continued to import onion seed from India, distributing it to all areas where there was a sale for it. The selling price covered expenditure, no profit being made by the Department.

The following table shows reported marketings in recent years:—

		Tons										
<i>Province</i>		1947		1948		1949		1950		1951		1952
Northern	...	1,958	...	2,085	...	2,191	...	1,320	...	1,265	...	1,763
Eastern	...	69	...	119	...	150	...	263	...	174	...	134
Central	...	—	...	297	...	158	...	640	...	924	...	—
Lake	...	—	...	—	...	144	...	148	...	38	...	2
Total		2,047	...	2,501	...	2,643	...	2,371	...	2,401	...	1,899

PULSE CROPS

A wide range of pulses is grown in the Territory, including pigeon peas, chick peas, soya beans, gram, bonavist beans, haricots, field peas introduced from Europe, and a number of others. The majority of cultivators sow a colourful mixture.

In the Eastern, Central, and Tanga Provinces yields were poor in the plains but average in the hills. Elsewhere in the Territory bean harvests were generally good.

The haricot bean crop is reported to have been the most successful crop of the year in the Northern Province, the acreage planted showing a further increase. A sound trade is being built up by experienced bean growers with canners in the United Kingdom, and although much of the native-grown haricot crop is at present unfit for canning the Native Treasuries of Moshi and Arusha are now financing the purchase of high quality seed from the local seeds industry.

Good crops of field peas were harvested in the Southern Highlands, the bacterial blight reported in the Territory last year, and recorded as occurring in the Southern Highlands in 1952, having had a negligible effect on yields.

The following table shows recorded marketings of pulses during recent years, but is no guide to the Territory's total production:

<i>Province</i>			<i>Tons</i>			<i>Comments (1952 crop)</i>
		1950	1951	1952		
Lake ...	...	—	7,346	6,977	...	Chiefly chickpeas, mixed beans and cowpeas.
Northern ...	...	—	10,177	3,728	...	Chiefly haricot beans.
S. Highlands ...	...	—	2,132	2,630	...	Also considerable un-recorded marketing.
Western ...	...	—	2,061	1,991	...	Chiefly mixed beans.
Eastern ...	...	—	635	613	...	Chiefly cowpeas and mixed beans.
Central ...	...	—	176	160	...	Chiefly cowpeas.
Southern ...	...	—	1,833	4,652	...	Chiefly mixed beans.
Total ...		<u>14,155</u>	<u>24,360</u>	<u>20,751</u>	...	

PAPAIN

A number of non-native farmers in the Northern, Eastern and Southern Highlands Provinces planted papaws during the year, and recorded deliveries of papain from the main centres (Arusha and Moshi) more than doubled.

After some years of low prices papain rose to around Shs. 38/- a lb. in 1951, and since then has ranged between this figure and just under Shs. 30/- for papain delivered by established growers known to the trade. During a previous "boom" in papain there were reports of widespread adulteration and although instances of gross adulteration have not as yet been reported during the present period of prosperity some evidence is available that careless preparation, and perhaps deliberate adulteration, has occurred in the recent past. It is, therefore, satisfactory to be able to report that (largely through the efforts of the Regional Assistant Director of Agriculture, Arusha) some thirty papaw growers, in the Northern Province and elsewhere have formed "The Tanganyika Papaw Growers' Association" with the object, among

others, of encouraging the export of papain which is true to description. If the majority of growers now join this Association it should be of great benefit to the world reputation of Tanganyika papain.

Exports of papain during recent years are shown in Appendix II to this Report.

PYRETHRUM

Owing to unfavourable weather, production declined in both the Northern and Southern Highlands Provinces. Planting in the forest glades of the Northern Province was on a smaller scale than expected, nevertheless there is a lively interest in the crop.

In the Southern Highlands long dry spells and low temperatures in July and August resulted in smaller yields of flowers. Most of the pyrethrum is grown in Uwemba but there is one established farm at Mbeya and trial plantings were made at Lupembe. The crop is becoming increasingly popular with African growers in Njombe, over five and a half hundredweights of dried flowers being produced by the cultivators of some three and a half acres. The produce was air-dried, but there are plans for the erection of a drier with financial assistance from the Njombe Native Treasury. A number of non-native growers have given active encouragement and assistance to the native growers.

Reference should be made to the note on "Field Experiments, Southern Highlands" in Section II of this report for information on the work of the Agricultural Officer (Experiments), who has been successful in stimulating farmers to carry out a number of valuable field trials. Dr. Furlong and Dr. Potter of Rothamsted visited Northern and Southern Highlands Province growers during the year in connection with biological and chemical methods for the assessment of pyrethrins and other active constituents of pyrethrum. Pyrethrum marketing arrangements are referred to in Section I of this Report under the heading "Marketing and Grading of Produce".

The following table shows the production of dried flowers from the two growing areas during recent years:

Province					Tons					
	1948	...	1949	...	1950	...	1951	...	1952	...
Northern ...	101	...	91	...	144	...	136	...	107	...
Southern Highlands	149	...	168	...	149	...	165	...	133	...
Total ...	<u>250</u>	...	<u>259</u>	...	<u>293</u>	...	<u>301</u>	...	<u>240</u>	...

RICE

There was a substantial fall in sales by growers at organized markets, as compared with 1951, and since the year was favourable for rice production in many of the areas where such a fall occurred it is assumed that there was a further extension of the tendency, noticeable

for a number of years, for this foodstuff to be consumed in the locality in which it is grown. There were, however, areas where yields were poor due to the uneven distribution of rainfall during the year.

In the Rufiji, where rice production has increased considerably in recent years (due in no small measure to the ploughing service operated there by the Native Authority) there were very destructive floods in the riverine areas during 1952, and the marketed tonnage fell from nearly 7,000 tons in 1951 to less than 1,000 tons in 1952. The actual crop was of course much in excess of this tonnage but serious losses undoubtedly occurred. Despite the financial loss to the growers occasioned by these floods enthusiasm was unabated and 7,720 acres were ploughed by the Native Authority's tractors for the 1953 crop on pre-payment by growers.

From many other areas in the Territory there were reports of floods interfering with land preparation or actually washing the growing crop from the ground, and these experiences (which are no novelty to the Territory) underline the need for controlled irrigation by means of permanent works rather than continued reliance on natural flooding—such flooding seldom providing just the right conditions for the crop.

A controlled water supply is the prime consideration in raising rice yields and the increment in yield to be obtained by plant breeding and refinement of cultural practices, though valuable, is likely to be small by comparison.

Trials continued with the combined culture of paddy and fish in constructed ponds, the Fisheries Officer (Fish Farming) now experimenting with long-term Malayan rice varieties (in addition to local rices) and two species of tilapia.

The Report of the Botanist (in Section III of this Report) records some of the current work in progress on rice varieties, while the Report of the Agricultural Officer in charge, Government Food Farms (also in Section III) is relevant.

The recorded tonnage of paddy (rice in husk) marketed by growers in recent years is shown in the following table:

		Tons	
<i>Province</i>	1950	1951	1952
Eastern	6,024 ...	9,305 ...	2,823
Central	20 ...	23 ...	—
Southern Highlands ...	3,228 ...	1,336 ...	3,000
Southern	2,783½ ...	2,755 ...	1,392
Western	914 ...	2,037 ...	2,250
Lake	5,155 ...	4,502 ...	5,185
Northern	194 ...	188 ...	51
Tanga	1,622 ...	1,806 ...	938
Total	<u>19,940</u> ...	<u>21,952</u> ...	<u>15,639</u>

SUNFLOWERSEED

Sunflowerseed production in 1952 was at least twice that of the previous year, only the Tanga and Northern Provinces reporting a fall in marketed tonnage. Production in the Western Province was outstanding. The producer-price is not controlled and the price fell somewhat below the very high levels of 1951. Good yields seem to be dependent on adequate rains—the crop cannot be rated as being in any way drought-resistant. Although a substantial drop in world prices may cause a rapid fall in production for export it seems probable that the crop is now entering into native diet, it being a very easily grown oilseed, and is unlikely to fall out of cultivation.

Recorded marketed tonnage during recent years is shown in the following table, but the export figures (given in Annexure II of this Report) are a more reliable guide to the recent increase in production.

Province	Tons		
	1950	1951	1952
Lake	107	495	1,777
Western	630.5	1,172.5	6,028
Eastern	623	816	1,303
Central	202	149	265
Southern	1,259	1,404	1,954
Southern Highlands ...	1,194	800	960
Northern	1,186	1,237	738
Tanga (Handeni District)	—	350	179
Total ...	<u>5,201.5</u>	<u>6,423.5</u>	<u>13,204</u>

SUGAR

The Tanganyika Planting Company at Arusha Chini produced a substantially increased tonnage of plantation white (and brown) sugar during 1952. Plantings on the estate are likely to be extended by several thousand acres during the next few years—the land having been acquired and the irrigation system laid out. Extensions to the factory have been made.

The possibilities of large scale plantings in several areas of the Territory were assessed during the year by a number of prospective planters, and others, but no decisions appear to have been reached, and the Arusha Chini estate remains the only producer on a large scale. There is of course a not inconsiderable out-turn of crude sugar from open-pan evaporation of the produce of small areas of cane.

It is worthy of mention that very considerable acreages of cane (in aggregate) are grown by native cultivators for the production of a popular fermented liquor; and that fresh cane is chewed.

The following table shows the production of plantation white (and brown) sugar by the Arusha Chini factory in recent years:—

		<i>Tons</i>
1947	...	7,606
1948	...	6,066
1949	...	7,659
1950	...	8,055
1951	...	8,805
1952	...	9,666

SESAME

Production in the main (Southern Province) producing area was about half that of 1951, severe losses due to flea-beetle attack being reported. Over 300 tons of the seed were milled locally. There was a considerable carry-over of the large 1951 crop, this resulting in exports being considerably in excess of the recorded tonnage marketed by growers. Eastern Province production was on about the same scale as in previous years.

The following table shows the recorded marketing of sesame in recent years:—

<i>Province</i>			<i>Tons</i>		
	1950		1951		1952
Southern ...	1,740	...	3,145	...	1,549
Eastern ...	385	...	279	...	286
Lake ...	12	...	37	...	64
Total ...	<u>2,137</u>	...	<u>3,461</u>	...	<u>1,899</u>

SEEDS

The seed-bean growers of the Northern Province had good yields but attacks by *Acanthomia horrida* (a species of sucking-bug which has occurred in the crops for some years) caused a somewhat widespread reduction in the quality of their harvested produce and necessitated careful cleaning prior to export. Trials conducted by the Department's Entomologist indicate that satisfactory control of this pest by spraying can be achieved.

Australia has, in the past, been one of a number of markets for Tanganyika seed-beans but the growth of the Australian seed-growing industry and the imposition of import restrictions will, it is feared, result in much reduced sales to that country. 1,251 tons of the 1951/52 crop had been exported by the end of the year, leaving a further 400 tons yet to be despatched. The development of a trade in white haricots for canning is closely linked with seed-bean growing and is referred to under "Pulses".

The production of seeds for export is controlled by the Tanganyika Seeds Board to the extent that growers are required to register contracts entered into with overseas buyers and the export of seeds other than to such buyers is not permitted. The growing of seeds as a

speculation is thereby prevented and the quality of the Territory's produce protected.

One aspect of seed growing in the Territory which seldom receives adequate mention is the sale to native growers, and estates, of a considerable quantity of maize and other seed raised on the Department's experimental stations and farms. Such seed is usually no better than a good sample of a well tried bulk but there is a brisk demand for it. Specialized commercial seed production, apart from the seed-bean growers and a few farmers who have developed a trade in seed maize, is as yet virtually unknown in the Territory. An innovation during the year was the production by the Department, for sale to farmers in the Southern Highlands, of nearly 2,000 ounces of "Ehlers" tobacco seed; a step taken owing to a threatened trade shortage.

Crops in previous seasons were as follows:

			<i>Tons</i>
1949/50	...	...	1,401
1950/51	...	...	1,173

TOBACCO

The flue-cured tobacco industry, centred on Iringa, continued to grow little else but the variety "Ehlers" which, though suitable to the district, is said to have a somewhat limited market. Production was somewhat below the 1951 figure, but most farmers produced a good percentage of bright leaf, the Southern Highlands Non-Native Tobacco Growers' Union reporting that the percentage of high grades in recent years was as follows: 1950—twenty-two per cent, 1951—forty-two per cent, 1952—fifty per cent. Labour and firewood shortages, excessive early rain and some hail, eelworm, cutworm, angular leaf-spot, mildew, and thin leaf due to drought were among the difficulties encountered—but there was a noticeable improvement in farmers' production methods, it being estimated, for example, that seventy-five per cent of the farmers now use fertilisers. Officers of the Department assisted two native growers to produce, and deliver to the Southern Highlands Non-Native Tobacco Growers Union, consignments of high-grade flue-cured leaf.

It speaks well for the growers that they have themselves evinced much concern at the rapidly dwindling supplies of fuel for use in curing barns and at the exposure to erosion of the lands surrounding the tobacco farms which is caused by too much tree cutting. They are also troubled by the effects of attempts to grow more tobacco than can be properly supervised. At the instance of these growers and of the Southern Highlands Non-Native Tobacco Board the Board has been given powers of licensing tobacco growers as to the area that each may plant, and of making conditions as to an area of trees to be planted at the same time.

New alienations of land have been made in a promising locality in the Tunduru District of the Southern Province. Six non-native farmers have made all preparations for growing flue-cured tobacco in 1953.

Fire-cured tobacco is almost exclusively the produce of native growers in the Songea (Southern Province) Biharamulo (Lake Province) and Kibondo (Western Province) Districts. Production in the Southern and Lake Provinces was smaller during 1952 than in previous years.

Some Songea growers are reported to have turned to sunflowerseed growing as being likely to give them greater profits, but the fall in the price of sunflowerseed which occurred during the year will probably result in a greater interest in tobacco during coming seasons; and there is no reason to suppose that the output from the packing factory of the Ngoni-Matengo Native Co-operative Union will not again reach its former level in course of time, although prospects for the 1953 crop seem likely to be adversely affected by the dry conditions at the end of the year. The Songea Native Tobacco Board, under whose direction the crop is marketed, is considering the employment of European field assistants in order to encourage production and improve the standard of quality of the leaf delivered by growers, particularly as regards drying. Conditions were not unfavourable for the 1952-harvested crop in the Southern Province.

Lake Province growers suffered from destructive flooding of their seed beds, with a consequent reduction in their planted acreage, but the Kibondo crop was a record one, due both to favourable conditions and an increase in the number of growers. The leaf is processed at the premises of the Nyamirembe Native Tobacco Board.

In the areas growing tobacco for fire-curing, and in many other parts of the Territory, a considerable tonnage of leaf is grown for local consumption, and for sale to neighbouring countries, in the form of coil, snuff, and cake. Comparatively high prices are often paid for such tobacco but prices fall steeply when the market is well supplied.

Work at the Department's Igumbiro (flue-cured) Tobacco station is referred to under "Agricultural Stations and Experimental Work", in Section II of this Report, and tobacco marketing arrangements are described under the heading "Marketing and Grading of Produce" in Section I.

The following table shows flue-cured and fire-cured tobacco deliveries by growers during the last few years:

<i>Flue-cured Tobacco (lb.)</i>						
<i>Area</i>	1947	1948	1949	1950	1951	1952
Iringa ...	749,389 ...	1,901,385 ...	1,710,816 ...	2,863,085 ...	2,736,190 ...	2,290,087

			<i>Fire-cured Tobacco (Tons)</i>			
<i>Area</i>			1950		1951	1952
Songea ...	...	...	1,185	...	604	400
Nyamirembe ...	...	...	182	...	210	188
Total ...			<u>1,367</u>	...	<u>814</u>	<u>588</u>

TEA

The Territory's acreage under tea continues to grow. Most of the new plantings are taking place in Eastern and Western Usambaras although some expansion is to be noted around Tukuyu in the Southern Highlands. There are now four tea factories in the Tanga Province and three factories in the Southern Highlands. In both the Tanga and Southern Highlands Provinces small and recently developed estates have been sending leaf to nearby factories for processing.

Apart from a severe drought in Mufindi early in the year conditions have been favourable for tea production. The Southern Highlands estates have been using considerable quantities of sulphate of ammonia, this being particularly suitable for the area owing to the sulphur deficiency which occurs.

The present acreage of tea in Tanganyika is 10,493.

The following table shows the reported production of made tea during the last few years:

		<i>(Weight in lb.)</i>				
<i>Province</i>	1947	1948	1949	1950	1951	1952
Tanga ...	341,029 ...	323,260 ...	452,000 ...	473,864	2,383,391 ... (a)	2,462,601
Southern Highlands ...	1,028,280 ...	1,168,149 ...	1,001,132 ...	1,274,808		
Total ...	<u>1,369,309</u> ...	<u>1,491,409</u> ...	<u>1,453,132</u> ...	<u>1,748,672</u>		

(a) Revised figure.

WHEAT

Interest in wheat growing by non-native farmers continues to decline in both the Northern and Southern Highlands Provinces, but native growers, especially in the Southern Highlands, are growing (and consuming) an increasing tonnage.

Northern Province yields, in general, were considerably lower than in 1951, the best non-native crops being in the region of ten to twelve bags per acre as compared with over fifteen bags in 1951. At the low and medium altitudes bird damage was exceptionally severe and it is feared that unless this problem can be overcome many of the wheat farmers in the Northern Province will turn to other crops. It is fortunate that conditions were unfavourable for stem-rust, and little loss of crop resulted from this or other diseases. It was a favourable season in parts of the Southern Highlands and in the Southern Province.

The Territory is indebted to the Department of Agriculture, Kenya, for the valuable advice on wheat varieties which is provided by their Senior Plant Breeder—who visits the Northern Province wheatlands annually. The investigational work on wheat varieties, cultural methods, and manuring, continued under the Agricultural Officer (Experiments) in the Southern Highlands and a summary of his report appears in Section II of this report

The reported marketed tonnages of wheat in recent years are given in the following table. Much native-grown wheat does not reach the markets.

<i>Province</i>					<i>Tons</i>		
					1951	1952	
Northern	...	...	...	7,475	...	4,902 (a)...	4,465
Southern Highlands	...	...	...	361	...	380	246
Southern	...	...	...	203	...	542	553
Western	...	...	...	13	...	11	—
Total					...	5,835 (a)...	5,264

(a) Revised figure.

MINOR CROPS

BEESWAX AND HONEY

A few non-native beekeepers use frame hives but the beeswax (and honey) coming onto the market in Tanganyika is the produce of simple hives tended by natives. The yield of beeswax in 1952 was approximately the same as in the previous year, but owing to a fall in the price offered for beeswax at the coast much was held back by the collectors until late in the year. The coast price was £500 per ton early in the year but soon fell and varied between £325 and £350 until November, when it rose to £365 and later reached £375. About 100 tons of honey were marketed in the Central Province but throughout the territory a considerable tonnage is consumed locally and made into native “beer”.

The Annual Report of the Beeswax Officer appears in Section III (and is summarized in Section II) of this Report.

Beeswax is not extensively used in Tanganyika, and the exports during recent years shown in the Appendix to this Report represent almost the entire production.

CINCHONA

Seven estates in the Usambaras produce “quills” and “chips” for export and in 1952 production increased to fifty-three tons as compared with forty tons in 1950 and forty-two tons in 1951. The factory for the manufacture of “Totaquin” tablets continued to operate on one of these estates, but production fell to thirty-four pounds as compared with 750 pounds in 1951.

DERRIS ROOT

Production continues to decline and only two tons were marketed, this being the produce of one estate.

ESSENTIAL OILS

Bitter orange oil is produced by one estate in the Tanga Province, production in 1952 being 1,988 lb. as compared with 5,600 lb in 1951.

In Uwenbe (Southern Highlands) geranium and eucalyptus are grown on a small scale for the distillation of the essential oils and the introduction of lavender from the United Kingdom is planned.

SPICES

Fifty-five tons of chillies were produced in the Northern Province and five tons in the Tanga Province during 1952. The Northern Province produced one ton of coriander seed, and the Tanga Province one ton of black pepper.

PALM OIL

Market returns from the main growing area, in the Western Province, show a decline in sales of palm kernels and pericarp oil, but it is thought that production was actually about the same as in 1951. The price for kernels fell from ninety cents to thirty-five cents per kg. Pericarp oil is being sold at about Shs. 1/50 per kg., mostly in retail quantities. Apart from thinning overcrowded plantations growers are now paying more attention to the proper care of their palms. The palms under trial near Kigoma are already yielding, though only four years old. The trials are designed to provide information on the yields of palms grown from Belgian Congo seed, the optimum spacing in plantations, and the most suitable inter-crops.

Recorded sales during the last four years were as follows:

				<i>Tons</i>			
				1949	1950	1951	1952
Kernels	...	...	...	240	225	370	334
Palm Oil	...	...	...	26	56	60	35

TUNG OIL

There is now no commercial cultivation of this crop.

CACAO

Two tons of cacao were grown on one estate in the Tanga Province. A number of very small trial plantings have been made in the Territory but conditions suiting cacao are rare.

KAPOK

Production in the Tanga and Eastern Provinces totalled 343 tons as compared with 381 tons in 1951. There were no reports of new plantings during the year.

GUMS (ARABIC AND COPAL)

Gum collection continued to decline, this being the normal effect of a state of general prosperity. Tanganyika gums were tested during the year by United Kingdom linoleum manufacturers, but were found unsuitable for this particular purpose. They are of course used in a number of other industrial processes.

The following table is of recorded sales by collectors during recent years:

<i>Province</i>	<i>Tons</i>			
	1949	1950	1951	1952
Central	115 ...	265 ...	85 ...	61
Eastern	36 ...	68 ...	16.5 ...	14
Lake	272 ...	614 ...	245 ...	148
Western	275.6 ...	683.8 ...	228.3 ...	206
Southern	21 ...	23 ...	5 ...	—
Total	<u>719.6 ...</u>	<u>1,653.8 ...</u>	<u>579.8 ...</u>	<u>429</u>

RUBBER

One estate in the Eastern Province continued to produce Para rubber, but the resumption of Ceara rubber tapping (reported last year) has, as expected, resulted in no real revival of interest in the old and neglected plantations which still exist in the Tanga Province.

BETEL NUT

The acreage of betel nut in the Pangani District of the Tanga Province is increasing, and a considerably larger trade in the produce should result. Recorded sales during 1952 were the same as in the previous year—seventy-one tons.

SWEET POTATOES

From the Tanga Province it is reported that a much larger acreage of sweet potatoes was grown in the Western Usambaras during 1952 than in the previous year and that the crop is becoming a remunerative cash crop as well as a stand-by for food, it being estimated that over 2,000 tons were sold during 1952 to estates surrounding the mountains. In parts of the Southern Highlands and Central Provinces considerably increased planting also occurred. Elsewhere in the Territory the crop is grown by native cultivators in almost every district, and planting is encouraged by the Department wherever conditions are suitable as sweet potatoes provide a most useful reserve of food in case of grain-crop failures. The conservation of planting material is frequently neglected by native growers and the Department's officers frequently have to assist growers to obtain new stocks. Sweet potatoes yielded heavily during 1952 and helped to stave off food shortages in many areas where grain-crop harvests were inadequate. There are no records of the annual total production of the crop.

EUROPEAN POTATOES

Although a greater acreage than in recent years is reported to have been planted in the Usambaras the yield, owing to weather conditions, was not large. In the Southern Highlands large crops of potatoes were harvested in the Porotos, some being exported to Northern Rhodesia at a time when other parts of Tanganyika were importing potatoes from Kenya and South Africa, transport from the Porotos to other parts of Tanganyika being uneconomic. In Section II of this Report reference is made to the work in progress on this crop at Kungului Farm, Lushoto.

Reported marketings in 1952 were as follows:—

<i>Province</i>	<i>Tons</i>
Tanga	150
Northern	345
Central	15
Eastern	105
Southern	26
Southern Highlands	1,155
Lake	84
Total ...	<u>1,880</u>

VEGETABLES

From the Tanga Province it is reported that the area planted with vegetables in the Usambaras in 1952 was a record, due to the ever increasing prices offered by sisal estates and Tanga greengrocers. The result, however, was disappointing, the reduction in recorded marketings being attributed to dry spells and poor seed. Recorded sales in the Morogoro and Kilosa Districts of the Eastern Province were considerably higher than in the last two seasons. It is thought that the establishment of a native Co-operative Society at Mgeta has helped to make recorded sales more representative of actual production. Yields were good but the usual seasonal shortage occurred in May and June. The Co-operative Society sells seeds and sulphate of ammonia to its members (numbering 2,300) in addition to negotiating for markets for their produce.

FRUIT

Citrus Fruit.—Oranges, lemons, limes, grapefruit, and tangerines are grown in small quantities in some of the more favourable parts of the Territory but the main orange growing area centres on Muheza in the Tanga Province. The packing and juicing plant which purchases the bulk of the Muheza crop again operated at a loss, although paying no more than an average of Shs. 17/56 per 1,000 lb. of fruit purchased. More than half the fruit purchased was juiced, and rather more than a third was sold fresh. The local Native Treasury continued to cover the losses incurred by the agents operating the juicing and packing

plant. Towards the end of the year new agents were appointed and it is hoped that future arrangements will result in greater prosperity for the industry.

The tonnage of oranges purchased by the packing and juicing plant at Muheza during recent years is shown in the following table:—

Tonnage of citrus purchased at Muheza

1947	...	...	...	...	793
1948	...	...	...	...	1,546
1949	...	...	...	...	1,204
1950	...	...	...	...	1,780
1951	...	...	...	...	422
1952	...	...	...	...	739

Other Fruits.—The Pangani District of the Tanga Province produces bananas for export to Zanzibar and for the Tanga market. Recorded sales during 1952 were lower than in recent years being 860 tons as compared with 1,698 tons in 1950 and 1,250 tons in 1951. No Panama Disease was found in the Pangani bananas, although it is feared that as the Pangani river rises in the Moshi area the disease might spread to Pangani rather easily. Bananas are of course grown in very large quantities in the Bukoba and Moshi Districts, and elsewhere, for local consumption.

A firm interested in the production of canned pineapples in the Muheza area imported some 54,000 stumps of Smooth Cavenne for division and planting, the majority being sold to native cultivators and sisal estates. The firm proposes to purchase the fruit which results

The company which set up a factory in the Usambaras for the production of passion fruit juice now relies entirely on native-grown fruit, some six tons being bought in 1951 and some twenty-five tons in 1952. Native production would probably have been higher if rainfall had been more evenly distributed, and more abundant.

We are indebted to the Director of Agriculture, Kenya, for permitting the Colony's Horticulturist to make an advisory tour in the Usambaras, Northern Province, and Southern Highlands, where he visited a number of fruit growers.

COLOMBO ROOT (*Jateorhiza Palmata*)

Dried root has been exported from the Southern Province for many years, largely to the U.S.A. (where it is used in the pharmaceutical industry). Weevil infestation of the root at the time of export has caused a fall in the demand and steps are being taken to install fumigation chambers at Mtwara Port.

Exports in recent years were as follows:—1950: 124 tons. 1951: ninety-three tons. 1952: twelve tons.

STAFF—EUROPEAN

The Director was on home leave for six months during the latter part of the year: during this period the Deputy Director, who had just returned from home leave, assumed charge of the Department. One Regional Assistant Director retired in September: his place is to be filled by the promotion of an Agricultural Officer.

In March the Department both individually and collectively suffered a very great loss in the untimely death of the Chief Soil Conservation Officer at Arusha.

Two Agricultural Officers retired during the year and one resigned at the end of his first tour to take up a farm in the Territory. Two Agricultural Officers arrived on first appointment and two more came out to gain a year's experience before undergoing the Trinidad course. At the end of the year there were thirty-eight Agricultural Officers serving out of a total establishment of forty-nine. Against these eleven vacancies, three officers are expected early in the new year, one in October 1953, and a further four in October 1954. The position may be considered as satisfactory but not ideal.

On the Specialist side one Fisheries Officer and one Master Fisherman were appointed and assumed duty. A probationer was enlisted for training to fill the vacant post of Botanist. One Tobacco Officer resigned, and it is proving very difficult to fill this vacancy.

A third post of Superintendent of Agriculture was created and filled by the promotion of an Agricultural Assistant.

The establishment of Agricultural Assistants was ninety-seven: this figure was increased in July by a further seven posts for the Lake Province Cotton Committee. Ten posts were "frozen" throughout the year owing to shortage of housing. There were eleven casualties and fifteen appointments; at the end of the year eighty-two posts were filled.

STAFF—NON-EUROPEAN

The Clerical Staff consisted of:—

- Twenty Executive Division.
- Fifty-four General Division.
- Forty-four Subordinate Service.
- Four Temporary.

The Field Staff included:—

- Six African Agricultural Assistants (one vacancy).
- Nine Coffee Grading Assistants.
- Ninety-nine Recorders.
- Twenty-nine Artisans.
- Two hundred and ninety-five Instructors, Junior Service.

Six hundred and forty-two Instructors, Subordinate Service.
Five hundred and eight Instructors, Food Production Staff.
Thirty-four Instructors, Copra Industry.
Sixty-two Overseers.
Ninety-six Motor Drivers.
Six Teachers (eight vacancies).
One hundred and two Instructors on Probation.
One Mechanic.
Two Industrial Instructors.

Recruitment to the Executive Division of the Clerical Service was improved by the appointment of candidates direct from India, but these men naturally required time to become acclimatized to Government routine and conditions in the Territory, and it is doubtful whether as a whole they will make an effective impression much before 1954. Asian clerks do not as a rule take kindly to the lack of amenities on research and experiment stations, and frequent difficulties occur in the filling of such posts in which a high standard of efficiency is so essential.

The number of Instructors in the Junior Service again increased as the result of further entrants from Ukiriguru and the promotion of past Ukiriguru students which was not completed in 1951.

An entry point examination was instituted for Recorders who do not normally take the Ukiriguru course; the examination follows closely that for the Clerical Service, but contains technical papers in place of typing and dictation. This is a big step forward, but further changes in the papers are necessary before the position can be regarded as entirely satisfactory.

PROVINCIAL SUMMARIES

LAKE PROVINCE

Weather.—There were heavy rains during November and December 1951 followed by a break in January, 1952, sporadic rainfall in February and March, then very heavy rain in April and May. This resulted in a long growing season.

Food Supplies.—Supplies were adequate during the year.

Native-grown Food Crops.—Both the acreages planted and the yields were below normal. This was due, in part, to the flooding of sorghum fields at sowing time and later but there was also a noticeable indifference on the part of cultivators to the necessity for adequate acreages of food-crops. Yields of Bukoba bananas continued to fall, due to depletion of fertility.

Native-grown Cash Crops.—A total of over 77,000 tons of cash crops with a value to the growers of over £4,300,000 were marketed. This represents an increase of over 12,000 tons compared with the previous year. Growers grouped themselves for the marketing of crops.

Cotton.—The crop amounted to 72,000 bales, a record figure.

Much of this increase was due to early planting, certainly facilitated by prolonged early rains but due in no small degree to propaganda by staff of the Department (and the Lake Province Cotton Committee). The acreage planted was not quite ten per cent greater than in the previous year. The season was the first during which only the strains Uk. 46 and Uk. 48 were planted—the old strain Mz. 561 having been given up entirely. The average ginning percentage of 32·55 was the highest on record, undoubtedly due to use of the new strains.

Coffee.—The 1951/52 crop was a very heavy one, exceeding 10,000 tons, and the current crop seems likely to be much the same size. Owing to the close liaison between the Department's staff and the staff of the Bukoba Native Coffee Board field work was much more satisfactory than before, but the quality of much of the dried cherry arriving at the hulleries was far from good and means of overcoming this state of affairs were investigated. All Bukoba coffee is now sold on the open market. The Board's nurseries grew 400,000 seedlings.

Sisal.—The extraction of fibre by Africans from the produce of boundary-hedge sisal declined during the year, the market price for such fibre falling to around £50 to £65 per ton.

Non-native Agriculture.—Two of the coffee estates in the Bukoba District are helpful in demonstrating the benefits of animal husbandry as a basis for successful coffee management. There were increased plantings of sisal early in the season. The production of crude sugar continues on one Bukoba estate.

Cotton and Maize Marketing by Native Producers.—Some 37,000 African cultivators prefer now to dispose of their cotton to the ginner through marketing associations, which are in many cases embryonic co-operative societies. There were more than thirty such associations in operation during the year. In North Mara there are nine African maize-marketing co-operatives, with a total membership of 820, but the future prosperity of these co-operatives is doubtful.

Field Extension Work.—With a staff totalling 1,286 the scope of the field extension work in progress cannot be covered in a summary of this nature. Much progress was made in introducing better methods to the native cultivators. Crop rotation, early planting, ridging, the use of animal manure and artificial fertilisers, the proper use of the growing number of ploughs now in use, rice-dam building and many other agricultural techniques were taught in the field.

Crop Surveys.—"Cultivator Record Forms" were issued to Instructors so that they could record the details and progress of each cultivator's cropping and these, together with boll counts to get a figure of cotton yield per acre, resulted in very accurate Provincial estimates.

Trials and Experiments.—The work of the Empire Cotton Growing Corporation, Ukiriguru, is described in Section III of this Report, and a note on the Maruku Coffee Station appears in Section II. The free distribution of phosphate fertilisers to selected native growers laid the foundation for simple observed field trials in future seasons.

Mechanization.—A ridging tool for use in the Mechanization Scheme (referred to elsewhere in Section II of this Report) was perfected. The Massey-Harris D.55 Tractor, of 48 draw-bar horsepower, has been fitted with an International Harvester Disc Chopper with two gangs of three discs each, which can be reversed to split or make a ridge. An hydraulic system had to be fitted to the tractors in an abnormal manner, and the gathering of these parts together to make a complete unit has taken two years. This unit does, however, put up an excellent ridge, well-suited to the needs of the Sukuma cultivator. Three tractors are now at work ridging cultivators' fields. A ridge-splitting implement has been devised with two discs which, pulled by a Ferguson, satisfactorily splits the old ridge in advance of the Massey-Harris.

The growing popularity of the ox-drawn digger plough particularly in South Sukuma, has laid even more emphasis on the great need for an ox-drawn ridger. Experiments have been in progress for the past five years devising a suitable implement, and the modified design mentioned in the last report has now proved reasonably satisfactory. Negotiations are in hand for a small initial order. Without an ox-drawn ridger cultivators may, in their enthusiasm to make the most of their newly acquired ploughs, which number at least 2,000 in Sukumaland this year, cause a lot of unnecessary soil erosion on sloping light lands which, in the Native Authority Rules, must be ridged. There are now about 5,000 digger ploughs in Sukuma. Trials with a Ransome's Queen Disc Harrow have also proved its suitability for this work.

The Talbot Ox-Cart has sold well, particularly in Shinyanga, but a number of faults have shown up, which can be corrected.

Note: Reference to other aspects of agriculture in the Lake Province will be found elsewhere in this Report. The crops grown in the Province include: Cotton, Robusta and Arabica grown coffee, tobacco, sisal, sorghum, maize, bananas, rice, groundnuts, sunflower, simsim, and cassava.

EASTERN AND CENTRAL PROVINCES

Weather

Unusually heavy rains were experienced in November and December, 1951, followed by the usual dry spell in January. The long rains broke earlier than usual in February but this was offset by the long dry spell in March and the complete cessation of the rains at the beginning of May. It was therefore a good season for the short rains maize and pulses, particularly in the coastal areas, but was a poor season for the main plantings of cereals in both Provinces, except in Ulanga District. In addition, the Rufiji valley suffered from a disastrous flood in May as a result of heavy rainfall somewhere inland in the catchment area of the river.

Main Features of the Year

The main features of the year were the poor food crops harvested, the improvement in the area under Native-grown cotton, the continued expansion of castor and sunflower production, the record acreage ploughed by the Native Authority tractor units in the Rufiji District (7,720 acres) despite the almost total destruction of the riverine paddy crop by excessive flooding, the steady progress of the Uluguru Land Usage Scheme, the increasing tempo of soil conservation works in the Central Province, the response to agricultural propaganda in Kondoa District resulting from the use of a small mobile cinema, loaned to the Field Officer by the Commissioner for Social Development, the phenomenal damage to grain crops, particularly in the Central Province, caused by vast hordes of *Quelea* finches, the launching of the Ugogo Development Scheme and the establishment of a vegetable growers' co-operative society numbering 2,300 members at Mgeta.

African Food Supplies

(a) *Eastern Province*.—In Ulanga District weather conditions were better than elsewhere in the Province and a bumper rice crop was harvested. The destruction of the riverine rice crop in the Rufiji District, combined with the failure of the post-flood maize crop resulted in a general shortage of food throughout the district, which would have been much more serious but for the extensive areas of root crops and bananas which had previously been established at the instigation of the District Commissioner. In Kisarawe and Bagamoyo the short rains maize crops and the extensive supplies of cassava and sweet potatoes served to carry these districts through a difficult season. In Morogoro the crops in the mountain areas once again served to offset the losses in the plains. In Kilosa District the maize crop on the plains was almost a complete failure and food supplies have been short for some months. In spite of this, beer brewing has proceeded as though cereal supplies were limitless, and action had to be taken by the authorities.

(b) *Central Province*.—The year started with nearly all silos full and the immense benefit of maintaining this strategic reserve of food will probably be demonstrated during the early part of 1953, since the combined effects of ill-distributed rainfall and the disastrous attacks of grain-eating birds will necessitate withdrawal of stocks from these silos before the 1953 crops are harvested.

The Eastern Province Cotton Crop

The following table shows the sales of seed cotton in recent years:—

<i>District</i>	<i>Sales in Tons</i>				<i>Producer Price per Ton</i>	<i>Value</i>
	1949	1950	1951	1952	1952	1952
					£	£
Morogoro	1,460	776	509	1,024	55	56,320
Kilosa	1,195	824	111	690	55	37,950
Ulanga	1,838	431	420	1,203	55	66,165
Rufiji	298	873	38	404	55	22,220
Kisarawe	19	7	3	15	55	825
Bagamoyo	812	411	272	587	55	32,285
Total	5,622	3,322	1,353	3,923		215,765

The target of 10,000 bales might have been achieved but for unseasonal thunder storms which destroyed the equivalent of nearly 1,000 bales of cotton which was ready for picking at the time. In addition, it is estimated that sixty per cent of the crop in the Logeloge area was destroyed by Pink Bollworm (*Pectniophera gossypiella*) and that, in general, the crop suffered from delayed planting caused by the unusual dry weather during March.

The production of African-grown cotton in 1952 represents an increase of 296% over that in 1951, and was the second largest crop produced during the past seven seasons. The increase in African-grown cotton far outweighed the reduction caused by the non-native planters' disinclination to grow cotton now that Government has had to forbid the sale of ungraded cotton. The following table of cotton production during the past seven seasons is of interest.

<i>Year</i>	<i>Production of Seed Cotton in tons.</i>		<i>Percentage of Crop</i>	
	<i>African</i>	<i>Planters</i>	<i>African</i>	<i>Planters</i>
1946	3,018	597	83	17
1947	3,620	306	92	8
1948	3,665	638	85	15
1949	5,622	1,744	76	24
1950	3,352	1,451	71	29
1951	1,397	378	79	21
1952	3,932	68	98½	1½

No account is taken of the unknown tonnage of African grown cotton bought by planters in 1949 to 1950.

The indications for the coming season are that there has been a favourable reaction on the part of Africans to the uniform price of cotton for all growers and that the area under cotton will be extended in several Ginnery zones.

It is reported from Ulanga that a great deal of the crop was lost because the growers did not pick it. Apparently by the time they had completed their first picking they had acquired all the cash that they needed and it is obvious that greater incentives are required if growers in Ulanga and other areas are to be persuaded to pick their crops properly.

The posting of an Agricultural Officer and Ginnery Inspector to the Province has enabled the Department to give the requisite attention to the ginning of the cotton crop. He reports that though the general standard of ginning is good there is still room for improvement, particularly in regard to the adjustment of gins and regular renewal and maintenance of working parts.

With the exception of Kilosa, Logeloge and Kiberege Ginneries the ginning percentage at all ginneries is above the cotton price formula of 30.75%.

Vegetables

The establishment of a Native Co-operative Society at Mgeta has helped to give a true picture of the total amount produced during the year. The recorded sales in 1952 amounted to 781 tons. Yields have been good but the supply has been irregular, the usual seasonal shortages occurring in May and June. The Society has also taken over the sale of vegetable seeds and sulphate of ammonia to members, who number 2,300. In Kilosa District African enthusiasm for vegetable production fluctuates considerably, but at Kidete vegetables continue to be grown and two or three other estates in the Rudewa area have now started growing for the local and Dar es Salaam markets.

Non-Native Agriculture—General

In the Eastern Province only eight planters are reported to have grown cotton in 1952, and owing to late planting their yields were low. Largely owing to the unsatisfactory weather maize yields were far below average. This disastrous maize year coinciding with the non-native planters' virtual abandonment of cotton growing meant that the majority suffered serious financial loss. The planters' lack of interest in cotton growing is due to the withdrawal of permission for non-native planters to deliver their cotton to the ginneries ungraded. This step was taken after it had been found that many native growers were selling ungraded cotton to the planters and the Province's output of high grade cotton and of sound seed had fallen very seriously. An

attempt is being made to interest planters in selective picking as a solution to their difficulties. The majority of non-native planters in the Province make insufficient use of crop rotation and fallowing but the standard of cultivation on a number of their estates has improved somewhat as a result of the purchase of tractors, ploughs, disc harrows, and rotary cultivators. The need is apparent on some estates for the growing of a greater range of crops, particularly permanent crops such as kapok, cashew nuts, papaw, and sugar cane. Where the terms of leases do not permit such plantings one is forced to the conclusion that the terms of such leases should be altered. The interplanting of maize with cotton has resulted in the build up and spread of American boll-worm, which is now the major pest of cotton wherever this system was practised.

Sisal growers continued to replant cleared areas and some of the smaller estates extended their acreage.

Estate production of copra during 1952 was as follows:—

		<i>Tons</i>
Kisarawe ...	...	1,500 (estimated on.y)
Mafia ...	...	952
Bagamoyo ...	...	626
Total ...		<u>3,078</u>

Estate production, therefore, represents slightly less than one third of the total production of 9,988 tons.

There are three well managed coconut estates under European ownership on Mafia Island and two in Bagamoyo District. Elsewhere in the coastal region few of the coconut estates can be described as satisfactory. The Agricultural Assistants in Bagamoyo, Kisarawe and Mafia Island have to spend a considerable amount of their time in endeavouring to persuade plantation owners to carry out elementary plant sanitation work. All too frequently nothing is achieved except under the threat of, or by actual, prosecution. The response to the coconut planting bonus scheme has been slow—the only planters who qualified for a bonus during the year being one Arab in Bagamoyo, one European in Mafia and two Europeans in Kisarawe.

The quality of copra produced on the European plantations on Mafia Island is exceptionally good. All nuts are collected from the ground and sun-dried except during spells of wet weather. De-husking of the whole nut is not practised, instead the nut is split open with a single blow of a sharp axe and after a short period of drying, the meat is extracted and carefully sun-dried.

On Ras Mbizi Estate there is a small area devoted to a species of dwarf coconut palm which is reputed to have been introduced from Malaya when the plantation was under German management. The palms appear to be prolific yielders and 105 nuts are reputed to yield a

frasila of copra. The palms can be planted closer together than the normal type, it being possible to plant at the rate of sixty-four palms per acre. At present the owner is under contract to supply his entire crop to neighbouring planters for seed for the next eighteen months, after which it is hoped to be able to purchase a supply of nuts for planting on the Coast Agricultural Station at Chambezi and on the Government Coconut Plantations at Bagamoyo.

In the Central Province the Overseas Food Corporation at Kongwa had a successful year, good crops of maize, groundnuts and Dobbs sorghum being harvested. Several thousand acres of American dwarf sorghums were, however, severely damaged by very large flocks of weaver birds—which also caused considerable damage elsewhere in both Provinces.

Field Extension Work

Apart from the usual advisory and instructional work among cultivators themselves particular attention was paid to assisting the primary and middle schools to improve the lay-out of their demonstration farms and gardens. In Kondoa District the Agricultural Assistant was loaned a 16 m.m. cinematograph projector by the Commissioner for Social Development and armed with this he has given numerous cinematograph shows. The films shown to date included "Trees are Cash", "Manure", "Mixed Farming in Nigeria", "Land and Water" and two short newsreels. He reports that the first four films were the best ones from the propaganda point of view and thousands of Africans have seen these and are still talking about them. It has been remarked that more manure is being put on the land this year than previously, though it is not clear to what extent the cinema was responsible for this fact. He adds that he is convinced that with the aid of both movie and still films, the Department will be able to achieve far more in Kondoa District than by any other method. Experience in the Ulugurus has been similar.

In the Central Province over 700 miles of pondage-type contour banks were dug by communal labour and a number of dams and hafirs were constructed. In the Eastern Province propaganda has been directed in all districts towards soil conservation measures such as contour banking and trash bunding but little progress was made with the protection of native fields, apart from the laying out of these trash bunds and contour banks on some 200.

The Uluguru Land Usage Scheme

A summary of the Annual Report of the Executive Officer indicates the progress of this Scheme. It is printed elsewhere in Section II of this Report.

The Rufiji Native Authority Ploughing Scheme

Reference is made to this Scheme under the heading "Mechanized Cultivation Schemes" elsewhere in Section II of this Report.

Trials and Experiments

Summaries of the work done at the Morogoro Farm and Dodoma Tribal Farm are printed elsewhere in Section II of this Report. The Annual Reports of the Empire Cotton Growing Corporation, Eastern Province, and of the Officer in charge, Ilonga Agricultural Station, are printed in Section III of this Report.

NOTE : Reference is made under the appropriate headings in other Sections of this report to production in the Eastern and Central Provinces. Eastern Province crops include maize, rice, pulses, cassava, sorghum and millets, sisal, cotton, copra, cashew nuts, castor, sunflower, sugarcane, coffee, kapok, vegetables, onions, potatoes, sesame, papaw, rubber. Central Province crops include sorghums and millets, cassava, maize, pulses, groundnuts, rice, castor, sweet potatoes, and gums. Small areas of other crops in both Provinces.

NORTHERN PROVINCE

Weather

In the producing areas of the Northern Province the 1951/52 short rains were heavy and prolonged, having started in October and continued right up to the end of the year. The long rains also commenced early, about mid-February, and continued to mid-April when they tailed off a month earlier than is normally expected. On the highest ground, largely in the forest reserves, the rains continued until later in the year.

Agriculture in the Districts

The effect on crops of the early cessation of the long rains was more serious in African areas than in the non-African areas due to the fact that the African plants his crops over a longer period commencing with the earliest rains and planting again half way through the rains. Generally in the Northern Province and particularly in the Moshi District, the later plantings failed. The result of this was a drop in the total figures of grain crops for sale but there were no food shortages. Food supplies have generally been abundant except in one or two small areas of Mbulu. The overall non-native crops of grain have been higher than usual for, although wheat was less, maize was more than last year. The 1951/52 coffee crop was good but the 1952/53 crop is short.

Major Crops

Maize.—The total maize produced for sale in the Province was 21,223 tons, against 28,515 tons in the previous year. The drop is due mainly to the poor African maize crops in the Moshi District. In 1951 the African maize crop in the Moshi District was 11,916 tons sold, whereas in 1952 the crop was only 4,625 tons. The Mbulu District

which is usually a drain on the rest of the Province produced sufficient for its needs and for filling its Native Authority grain stores. Arusha was pretty well normal in African production, and produced its usual quota of about 4,000 tons.

Estate maize maintained a high level which has kept up the total production for the Province even though there was a short fall on previous records. There was a large increase in the Loljoro area. Estate production in 1951 was 11,584 tons and this year rose to 12,518. Owing to the early cessation of the rains, there was dry weather during ripening and harvesting so that the Province has been practically free of pink ear rot and there were no other insect pests or diseases that had any serious affect upon the extent of the crop. Figures of production over the years have been as follows:—

1945	...	9,273	1949	...	8,223
1946	...	3,391	1950	...	23,810
1947	...	11,314	1951	...	28,515
1948	...	17,597	1952	...	21,223

Beans and Pulses.—The beans crop in the Northern Province has been the most successful crop of the year and this is normal in a dry year such as this has been. The acreage of mixed beans for sale was reduced, but the area under haricot beans was increased again, as it was last year. The production of haricot beans rose from 2,086 tons in 1951 to 3,555 tons in 1952. In the lower areas of Moshi in 1951 a fair quantity was produced but it was of doubtful quality and very mixed. Speculation took place and high prices were paid to the Africans for this small section of the crop. However, traders were heavily hit when they came to exporting, as the beans they had bought were not acceptable. This was inevitable and the people who wish to remain in the haricot trade now realise that expensive machinery and hand sorting is necessary in order to earn the profits that can be made. In the Arusha District much of the haricot bean trade is in the hands of the export seeds growers who use the same machinery for haricot beans as they do for their seeds, and also employ the same trained hand sorters. There is no doubt that the highest quality haricot beans for canning are leaving Arusha month by month, and a very sound trade is being built up with canning firms in the United Kingdom. The Native Treasuries of Moshi and Arusha purchased high quality seed from the local seed industry, which is free of disease and has proved its local suitability. A sum is to be set aside each year by the Native Treasuries in a suspense account for the purchase of haricot bean seed for re-sale to natives. The price is the commercial one, which is high, yet the Africans are very willing to buy. Production of cowpeas and other pulses was normal during the season.

Coffee.—The 1951/52 crop has been a record for African production in the Moshi District although there was a slight drop in the Meru crop. Estate coffee was also well above average for some years.

Quality was good. Owing to the prolonged 1951 short rains harvesting was a protracted business, and labour was short which caused a good deal of loss of parchment which had to be allowed to go to buni. In addition to this there was a certain amount of loss from rotting of cherry on the ground. The 1952/53 crop is not good. The native crop is below the average of the last year or two and the estate crop will be much less than last year. Picking is almost finished. Production over the years has been:—

					<i>Tons</i>	
					<i>Native</i>	<i>Estate</i>
1945/46	...	...	...	...	3,196	2,992
1946/47	...	...	...	...	2,479	827
1947/48	...	...	...	...	4,429	2,635
1948/49	...	...	...	...	3,399	1,310
1949/50	...	...	...	...	3,225	2,246
1950/51	...	...	...	...	5,455	1,619
1951/52	...	...	...	...	5,987	2,582
1952/53 estimate...	...	...	...	...	4,300	1,200

The 1951/52 parchment figures are made up as follows:—

						<i>Tons</i>
Estate coffee:						
Moshi District	...	...	...	...	...	1,010
Arusha District	...	...	...	...	...	878
Oldeani and Mbulu Districts	...	...	...	...	...	694
					Total ...	2,582
African coffee:						
The Kilimanjaro Native Coffee Union Ltd.	...	...	...	...	...	5,674
Meru Native Coffee Growers' Association Ltd.	...	...	...	...	...	235
Arusha African Farmers Co-op Society Ltd.	...	...	...	...	...	77
					Total ...	5,987

Wheat.—Wheat production continued on its downward trend in the Northern Province during the year. Birds took a very heavy toll particularly in the Ngare Nairobi and Olmolog areas of the Moshi District, and in such parts of Arusha District as planted wheat. The Oldeani area did not suffer heavily from birds although the native areas near Karatu did. The latter plantings were not extensive. The wheat crop fell from 4,902 tons in 1951 to 4,465 tons in 1952.

The native wheat crop was approximately 165 tons in 1951, practically all from Arusha, and in 1952 none from Arusha and all from Mbulu. In the Mbulu District native wheat growing has been pushed as hard as possible but there has been very little increase in marketing as a result. It is reported that a good deal more was planted, but most of it was eaten. Only 165 tons came onto the market.

The long rains' early cessation had a severe effect on all wheat crops in the lower altitudes. At the medium altitudes the effect was less, and at the high altitudes the crops were good. The very high yields that were obtained in 1951 in various places did not appear again in 1952. The best farms, which in 1951 had had yields exceeding fifteen

bags yielded in the region of ten to twelve bags per acre. Some of the high yields were reduced by birds but the birds generally did not do the damage at the highest altitudes that they did at the low and medium altitudes.

A short rains crop was planted in October in the newly alienated land at Olmolog. There was some success in growth but at the end of the year the birds were taking their toll, and it was reported later that this crop was in process of being wiped out entirely. In the Arusha area wheat growing has practically stopped, and it will not start again unless bird damage can be eliminated. These farms produced always the best wheat, and were the steady crops upon which the flour mills could rely. Yield per acre was around twelve bags, and wheat growing in this particular area has been established longer than probably anywhere else in the Territory. This year there was no wheat here, nor in Loljoro which is no more than marginal country for wheat and now bird damage has put it right out of wheat growing. Only one farmer is planting wheat in the area and he is doing that only because he happens to be equipped for wheat growing and for no other crop. Production over the years has been as follows:—

<i>Year</i>		<i>Tons</i>	<i>Year</i>		<i>Tons</i>
1943	...	3,222	1948	...	3,662
1944	...	4,701	1949	...	4,315
1945	...	3,288	1950	...	7,475
1946	...	3,886	1951	...	4,902
1947	...	2,259	1952	...	4,465

Field Extension Work

In addition to the numerous and varied advisory and instructional duties involved in assisting the improvement of agricultural techniques much attention was paid to the application of approved soil conservation measures to native lands, in close collaboration with the Soil Conservation Service. In the Mbulu District it may now be said that every native holding is trash banded.

Development Schemes

The phase of the Mbulu Development Plan covered by a vote of £90,000 from the Colonial Development and Welfare Fund was brought to a very successful conclusion at the end of 1952. The Department of Agriculture has been very closely concerned with this scheme since its inception. It is referred to elsewhere in Section II of this Report.

Trials and Experiments

A number of field experiments and observation trials were conducted during the year. Some being continuations of previous work. Some of these experiments and trials are listed below:

Sugar Cane: To determine optimum irrigation.

Irrigation in Saline Soil: To determine optimum irrigation for maize, rice, haricot beans and onions.

Sugar Cane Fertiliser Trial: To determine optimum nitrogen application.

Resistance of Wheat to Stem and Yellow Rust: Variety trials.

Barley Variety Trials: To determine high yielding varieties.

Hibiscus Observation Plots: To make preliminary observations on cultivation and obtain fibre samples.

Sorghum Spacing Trials: To determine optimum spacing between and in the rows.

Sorghum Observation Trials: To determine high yielding varieties.

Application of Fertiliser to Maize: Effect of N, P, and NP.

Application of Nitrogen to Onions: To determine optimum quantities and method of application.

Linseed Variety Trial: To determine high yielding varieties.

Selective Weedkiller Demonstration: "Agroxone", "Fernoxone", and "Dicotox" were demonstrated.

Castor Seed Trial: Two varieties of supposed dwarf castor were planted to determine their utility for combining.

Miscellaneous Observation Plots: Sunflower varieties, soya bean, sorghum, coriander, maize varieties, bean varieties, and lucerne, were sown in plots on an area newly opened for non-native settlement.

Many useful results were obtained and a number of the trials will be repeated in the coming year. A series of observation plots and experiments were laid out in the Mbulu District in order to provide information in connection with the implementation of the Mbulu Development Plan. These are referred to elsewhere in Section II of this Report.

NOTE : Many other aspects of agriculture in the Northern Province are dealt with under the appropriate headings elsewhere in this Report. Among the crops grown in the Province are the following : Maize, wheat, eleusine, sorghums, pulses, bananas, sweet potatoes, coffee, sisal, pyrethrum, haricot beans, sugar, cotton, papaw, castor, sunflower, onions.

TANGA PROVINCE

Weather

Throughout the Tanga Province the 1951/52 short rains were exceptionally heavy. In October, November and December records were as much as three times greater than normal. Thus in January the year started off with good prospects and cultivation was well ahead. The early promise was, however, not fulfilled, for although the long rains started off very well they tailed off very early in the season with

the result that most of the long rains crops that did not shrivel up yielded very much less than they ought to have done. Crops were re-planted, particularly in the plains areas of the Pare District and of the Handeni District but these replantings were of no avail, and the Handeni District suffered once again one of its periodic droughts.

Agriculture in the Districts

During the year under review the effort everywhere in the Tanga Province has been directed as usual mainly to production. As stressed in previous reports the Tanga Province has a heavy burden to carry in that over half the Territory's sisal production is in this Province and the labour force comprises the biggest concentration of labour in the Territory, and these are appearing more and more with their dependents. This system from a labour point of view is very desirable but from the point of view of food production the burden of course becomes heavy. In addition, development of tea estates has been increasing in the Tanga Province and this also requires a good deal of food for the maintenance of labour, and Tanga the second largest township in the Territory also takes its toll.

The season, as already shown in a previous paragraph, was a poor one, but stocks were held by Grain Storage and by the main producing area's Native Authorities stores which carried the Province well into the year.

The Tanga and Pangani Districts

Along the coast the food position has not been unsatisfactory though local shortages have been reported here and there as the season went on. A good deal of food has gone to the coast, however, from inland, as cassava was not so extensive as in the last seven years.

Handeni District

Many areas in Handeni harvested practically no crops at all, but fortunately there were other sections that, although far from attaining the normal production, did at least produce something. Thus, the Native Authorities were able to maintain grain store filling, and the previous season's grain having been sold to short areas, some 500 tons was purchased locally from more fortunate places for re-filling. Also, the policy of every cultivator being forced by his Native Authority to maintain half an acre of cassava was well observed so that in spite of drought there has as yet been no acute food shortage. The most trying time, however, of the drought period in the Handeni District will fall in 1953 during March and April before the first of the short rains crops come in.

Lushoto District

In the mountains, the main rains were rather less than usual and were late in starting also, and they finished, in common with most places in the Province, rather earlier than normal. In the plains the situation was much the same as in the mountains, particularly in the Luengera Valley. However, a much bigger acreage throughout the Usambaras, both plains and hills, was planted than is usual. Generally speaking, therefore, although the Usambaras was, as usual, short of abundant food, no importations were necessary. The favourable position is due almost entirely to the sweet potato crop. As has been stressed in reports for the last five or six years the Usambaras formerly depended almost entirely upon European potatoes for its food. This crop went out with the appearance of *Phytophthora* Blight and since 1947 the pushing of sweet potatoes has been going on. A vast increase that has taken place this year has covered any shortages in other crops. Marketing of sweet potatoes is also growing and sisal estates below the mountains are purchasing these in large quantities for their labour. In the plains a great deal of progress has been made in the opening of new irrigation schemes and in the improvement of old ones. The policy of working only on good land for the expansion of the people from the hills has been implemented now, and a good understanding by all members of the District Team of the object that they have in view on the plains is quite apparent in the success that has been attained.

Pare District

The rainfall was short following the heavy 1951/52 short rains. The plantings, however, which took place with the 1951 short rains practically all failed because first it was too wet and then when the rains ceased abruptly in January the plantings dried up as no rain then fell until it was too late to bring them through. On the whole in the Pare District the rains have probably been the poorest since 1948. All the people in the plains areas have depended almost entirely on the irrigated areas. The cotton crop, too, failed for the first time for many years. In the hills irrigation has had to be brought into the picture in order to get any crops to mature, and it was only the bean crop, which is very short term, that attained any success. There were good plantings of cassava and sweet potatoes with the 1951/52 short rains and those that did not suffer from the heaviness of the rains came through and were of great help in preventing what might have been some distress.

Major Cash Crops

Sisal.—The production of sisal has increased during the year and continues to do so as new areas come into production. The production

in the Tanga Province increased very substantially as shown in the figures of production below:—

<i>Year</i>		<i>Tons</i>	<i>Year</i>		<i>Tons</i>
1946	...	54,727	1950	...	69,866
1947	...	54,780	1951	...	74,754
1948	...	62,060	1952	...	91,780
1949	...	72,349			

The value of the sisal crop in the Tanga Province has been assessed at over £13,000,000 and the acreage under sisal is put at about 250,000. The production in the Tanga Province is well over half the production of the whole Territory.

Coconut and Copra.—Copra production during the year amounted to 4,081 tons which is an average crop for the Tanga and Pangani Districts. Yields towards the end of the year tailed off and prospects for the coming season are not bright owing to the failure of the main 1952 rains. Prices have varied considerably between Shs. 7/50 and Shs. 20/- per frasila. The highest prices were paid by traders who entered for a time the export market, but local mills would not pay more than Shs. 16/- even for the best kiln dried. The prices paid to the Gombero Co-operative Society were the best as it managed to sell its entire crop at an average of Shs. 14/50 per frasila, even when prices were at their lowest. The members of the Society number only 108 but they are very keen and have worked fairly efficiently during the year. The general quality of copra in the Tanga District is no better than it has been in previous years except for the comparatively very small quantity produced by the Gombero Society. There will, however, be a larger quantity coming on to the market in the 1953 season when the Government Plantation kilns are brought into use.

Coconut sanitation has been pushed as hard as possible during the year, since the Government Plantations have come into line as well. A census of dead and diseased palms owned by Africans in the Tanga District gave the following figures:—

Dead palms	...	10,050
Dying palms	...	2,464
Stumps	...	2,675

Warnings and prosecutions were engaged in to eliminate these, throughout the year, and at the end of the year it is estimated that well over eighty per cent of the dead and dying palms and stumps have been dealt with. The Muheza area which has led the way in the work, is considered to be 100% clean.

As regards non-native production, much improvement can be recorded and the main estates in Tanga are now clean. Pangani has been rather slack and plans are completed for a drive early in 1953. During the year 138 notices were served on non-natives, but it was only necessary for two prosecutions to be taken, and it may be said that the non-natives are co-operating.

The coconut planting bonus was claimed by five people in the Tanga District and four in the Pangani District, and the total amount paid was Shs. 17,530/-. Plots that are nearing completion for next year's bonus amount to some twenty in the Tanga District and eight in the Pangani District, and the interest in the scheme is growing all along the Tanga coast. Nurseries for the bonus plots are situated at the Dairy in Tanga and near the boma in Pangani. The Tanga nursery amounts to 30,000 plants all of which are on order. Sales of plants are only made when the weather is suitable for planting. In the coming season additional nurseries are planned.

The cleaning up of the Government Coconut Plantations which had been commenced by this Department in 1951 was handed over to the Veterinary Department in 1952, and a good deal of progress has been made. Nine hundred acres were cleared of bush and weeds during the year and over 8,000 dead and beetle affected palms were cut and stacked for burning. Two kilns were built, one of which operated towards the end of the year, 1,731 frasila of copra averaging 128 nuts per frasila being produced.

The Gombero Co-operative Society which is the aftermath of the Gombero Development Scheme for kiln drying copra was registered during the year, and is operating fairly successfully, although in rather too small a way at present. There are other Societies in the process of formation but on a different basis to the Gombero Society. It has been definitely stated everywhere that no money will be advanced by Government for the starting of Co-operative kilns. These are cheap and a small subscription by a group of cultivators can easily get a kiln into operation. This has been demonstrated at Mtandikeni where a group of Africans clubbed together, put a few shillings each into a "pool" and actually built their own kiln. Two other areas are very interested, and will no doubt start in the early weeks of 1953, but one group at Mpirani have failed to agree and are still bickering about the final site of their kiln. During the year four kilns were built by non-natives and others have expressed a good deal of interest.

Other Cash Crops

Oranges.—The main Muheza crop this year was 739 tons of which 664 tons were bought by the Native Treasury's agent and one licensee. This was below average and was caused by the failure of the long rains. The fly crop was a complete failure. Prospects for the coming year are not very bright but it is likely that a small tonnage may come on the market in February if the rains which have been falling at the end of the year continue and swell the fruit.

Figures over the years were as follows:—

Year	<i>Crop actually sold</i>		
	<i>Total</i>	<i>Main Crop</i>	<i>Fly Crop</i>
1944	1,613	1,413	200
1945	1,496	1,411	85
1946	1,184	264	920
1947	793	278	515
1948	1,546	1,290	256
1949	1,204	1,180	24
1950	1,780	39	1,738
1951	422	62	380
1952	759	759	Nil

Monthly Purchases for years 1949-52					
<i>Month</i>	1949	1950	1951	1952	
January	71	3	109	8	
February	—	—	—	—	
March	—	—	—	—	
April	42	—	—	—	
May	237	24	21	129	
June	419	15	54	323	
July	310	—	—	169	
August	101	6	7	—	
September	—	199	32	130	
October	—	557	76	—	
November	7	607	95	—	
December	17	369	48	—	
Total	1,204	1,780	422	759	

Average price per 1,000 lb. of fruit paid to growers at all markets since 1944:—

<i>Year</i>	<i>Shs</i>	<i>cts.</i>	<i>Year</i>	<i>Shs</i>	<i>cts.</i>
1944 ...	13	52	1949 ...	17	56
1945 ...	17	00	1950 ...	17	36
1946 ...	15	80	1951 ...	17	56
1947 ...	16	13	1952 ...	17	56
1948 ...	16	14			

All fruit offered was purchased. The following were the distributions during the year, of the crop bought by Dalgetys:—

	<i>Main Crop</i>	<i>Fly Crop</i>	<i>Total</i>
Purchases	1,202,616	Nil	1,202,616
Sales	451,467	Nil	451,467
Used for juice	670,240	Nil	670,240
Discarded	78,909	Nil	78,909

There was no difficulty in marketing this year, and Dalgetys the Agents for the Native Treasury licensed one other buyer to purchase in the far markets whilst they themselves attended only to those markets within a five-mile radius of Muheza itself. The licensee supplied fresh fruit only, Dalgetys expressing juice from the bulk of what they had bought. The production of juice since 1947 was as follows:—

<i>Year</i>	<i>Gallons</i>	<i>Year</i>	<i>Gallons</i>
1947 ...	3,020	1950 ...	33,399
1948 ...	16,390	1951 ...	4,346
1949 ...	16,920	1952 ...	16,311

The financial position remained the same during the year for in spite of economies made the trading account again showed a loss. Figures over the year were as follows:—

<i>Year</i>			£	<i>Year</i>			£
1944	...	...	Profit 808	1949	...	...	Loss 199
1945	...	...	Profit 759	1950	...	...	Loss 198
1946	...	...	Loss 625	1951	...	...	Loss 2,180
1947	...	...	Loss 540	1952	...	...	Loss 200
1948	...	...	Profit 192				

The 1952 figure is not final. It represents working loss over the year.

From the foregoing figures it will be seen that it has been found impossible for the Native Treasury to continue financing the scheme in its present form. It has been found impossible to obtain money to buy the necessary machinery for expressing juice on a large enough scale to be entirely economical. It was thought that the whole Muheza collective marketing scheme would, in the end, have to be abandoned but fortunately a company registered in Kenya, Messrs. Federal Products Limited, became interested and has, towards the end of the year, replaced Dalgetys as the Agents. The company proposes to act as Agents only for a very short while, that is, for the coming fly crop. At the end of that time they will operate on a basis yet to be arranged. They are to take over such items of property of the Native Treasury as may be useful to them, but most of the plant is now obsolete (it was only a pilot plant to explore the possibility of juice production) and the company is proposing to install entirely new machinery, erect new buildings, and to engage in the canning of orange juice for the export market.

Attention has been given to the care of orange groves and a Crop Supervisor has been posted to the Muheza area to give full-time attention to that side of the orange production. A good deal of *Loranthus* spp. has been eliminated. There has been quite a spread of it in recent years. Seed bearers have been selected and seedlings will be propagated with a view to ascertaining whether these might be superior for juice production to the budded trees which have been distributed in the past.

Major Food Crops

Maize.—The maize crop throughout the Tanga Province was poor, and the Handeni District with a drought approximating very closely to that of 1949 produced very little. It may be said that as far as maize is concerned the Tanga Province lived on its 1951 reserves, and then had to import for the sisal industry, for the Tanga Township, for the tea and other industries. In the Handeni District which has been the heaviest producer and has become what might be termed the granary

of the Province, sales since 1947, when exports first started, has been as follows:—

<i>Year</i>		<i>Tons</i>	<i>Year</i>		<i>Tons</i>
1947	...	3,014	1950	...	5,412
1948	...	7,216	1951	...	3,180
1949	...	Nil	1952	...	566

Non-native production of maize in the Tanga Province was not recorded. Since the abolition of the Production Committee in that area no programmes of production are received. It is, however, estimated that some 5,000 acres were planted by various companies and estates, but yields in most cases were very small. In the Luengera Valley the sisal estates raised normal crops.

Rice.—The South Pares, which has been the main producing area of the Tanga Province, sold less than normal, 862 tons against a normal average of about 1,400 tons. The South Pare crop has had losses previously unknown before mechanical cultivation was introduced. The 1951/52 heavy short rains made it too wet for the tractor to plough with the result that little planting occurred, with consequent low yields, where as formerly with hand cultivation and ox-drawn implements this difficulty was not experienced.

In contrast to this a great deal of effort has been put into rice cultivation in the flood areas that were previously cultivated on the Luengera River and around the Usambara Mountains in the Lushoto District. New areas have also been opened up. The following were the Lushoto District acreages under paddy since 1948:—

<i>Year</i>		<i>Acres</i>	<i>Year</i>		<i>Acres</i>
1948	...	1,000	1951	...	980
1949	...	1,000	1952	...	2,942
1950	...	646			

In the same years the acreages planted in the Luengera Valley and which are of course included in the above, were as follows:—

<i>Year</i>		<i>Acres</i>	<i>Year</i>		<i>Acres</i>
1948	...	500	1951	...	459
1949	...	528	1952	...	1,020
1950	...	296			

The present acreage is about the maximum area that can be planted in naturally suitable swamps, and further extension of rice growing in the District is being brought about by the improvement of existing irrigation furrows and by the construction of new furrows in suitable areas, which are now under survey. Plans are already complete for the construction of six such new furrows which will bring practically another 2,000 acres under paddy. At the close of the year two such sites are having weirs and pilot furrows constructed.

Cassava and Sweet Potatoes.—On the coast the usual drive to get the cassava lines planted in time was late this year owing to a misunderstanding of an order issued regarding the planting in the Moa area. At the time when cassava should have been growing practically

nothing had been planted with the result that one of the inland areas which had good crops practically had to keep the Moa area going in food stuffs for some considerable time. However, the lesson has been learnt. The old system of planting, on the lines which have been customary since about 1945, should continue. In the Usambara Mountains a much larger acreage of sweet potatoes was planted than in 1951, and there has been an excellent surplus for sale to sisal estates. In fact the sweet potato crop of the Usambaras is becoming a remunerative cash crop as well as a standby for food, and it is estimated that over 2,000 tons were sold during 1952 to estates surrounding the mountains. As the former export of potatoes prior to the appearance of *Phytophthora blight* in 1943 was in the region of 2,000 tons it can be seen that the sweet potato is at last taking the place of the potato in the economy of the Wasambaa.

Cassava in the lower areas and foothills has also greatly increased in the Usambara Mountains although it could still be extended in the Pares. The increased planting in the plains areas of the Usambaras was very well timed, for the almost complete failure of the long rains in most areas would have been the cause of an acute food shortage had the people not had their good reserves of cassava.

Field Extension Work

There was a normally full programme of advisory and instructional work, much attention being paid in the plains areas to encouraging and facilitating greater rice production and the maintenance of adequate reserves of cassava. In the hills and fan-slopes of the Western Usambaras, where a Superintendent of Agriculture is attached to the Usambara Scheme (the progress of which is reported elsewhere in this Section) field work forms part of, or is very closely linked with, this comprehensive scheme for the conservation and improvement of natural resources and for general agricultural betterment. Soil conservation was also the subject of much extension work in the Pare hills.

Trials and Experiments

During 1952 a total area of thirty-six acres of experimental plots were laid out between six locations in the plains areas of the Lushoto District. Three of these are on the east and three on the west side of the mountains. The work was carried out entirely by the Agricultural Officer with his staff, but was paid for by the Usambara Scheme Funds. Cultivation and ridging was done by mechanical equipment belonging to the Usambara Scheme and all other operations were carried out by hand labour on piece work rates, comparable to those paid by Sisal Estates. The crops used were rice, cotton, maize, cassava, sweet potatoes, millets, sorghums, groundnuts, buckwheat and hibiscus varieties.

In every case in which there was a comparison between methods of cultivation contour ridging demonstrated its superiority over flat cultivation as a method of water conservation in a year of poor rains, ridged plots often giving over double the yield of flat cultivated plots beside them. In no case was the yield depressed by ridging. The work of obtaining yield data of various crops under different soil and rainfall conditions will continue.

Eighty acres of paddy planted in the Luengera River irrigation pilot scheme area at the end of 1951 failed because of high salinity of the soil which had come about as a consequence of flood irrigation. A trial area of twelve acres was laid out this year to test the possibility of washing the salt from the soil by a system of irrigation trenches and deep drainage ditches similar to the system employed in the Tanganyika Planting Company's sugar estate at Arusha Chini in the Northern Province. The ditches were filled with water fifteen times and at the end of these "leachings" crystalline salt no longer formed on the surface when the soil dried as had previously been the case. Transplanting of rice in this experimental area was done at the end of November and the plants are now about fifteen inches high. The experiment was sub-divided into plots and treated with rotted sisal waste. So far the plants in the plots treated with the sisal waste appear to have made better progress and to be cleaner and healthier looking than in the plots not so treated. Further sub-divisions for treatment with gypsum however brought no appreciable benefit. This experiment will be continued as results are so far very promising. The co-operation of the Government Chemist in this trial is much appreciated.

In consultation with the East African Agricultural and Forestry Research Organization fertiliser reconnaissance trials were carried out in the Usambara highlands. Factorial trials will follow in 1953.

In addition to demonstrating the advantages of tied-ridge cultivation, the farm at Handeni which is supervised by the Department was used for observation and palatability trials of mosaic-resistant cassava varieties originating from Amani.

Work in progress at Kungului Farm, Lushoto, is referred to elsewhere in Section II of this Report.

NOTE: Reference to other aspects of agriculture in the Tanga Province will be found elsewhere in this Report. The principal crops of the Province include: Sisal, tea, copra, maize, sorghums, cassava, sweet potatoes, rice, pulses, and a large variety of crops of lesser importance including coffee, cotton, fruits and vegetables, kapok, betel nut, cinchona, etc.

SOUTHERN HIGHLANDS PROVINCE

Weather

Although the year's rainfall in the Iringa and Njombe areas was below average and the rains ended rather earlier than usual it can be said that the weather throughout the Province was satisfactory, the rains being adequate and sufficiently well distributed in most areas.

African Food Supplies

Except for the occasional individual who over-sold and began to "feel the pinch" towards the end of the year there was no shortage of food in the Province. There was, indeed, an abundance.

African-grown Foods Crops

Production was exceptionally heavy, especially of maize, and the Province was able to supply other areas of Tanganyika on a large scale. An outstanding feature was maize production in the Ismani area, which totalled 4,000 tons—yields being estimated to be as high as twenty bags to the acre in some instances. Rice, wheat, beans, peas, and the majority of other food crops yielded well and were marketed in larger quantities than usual.

African-grown Cash Crops

The coffee crop in Rungwe and Mbeya was a good one, as were the Njombe and Mbeya sunflower crops. Groundnuts did well, but the crop is not a popular one. There was a moderate increase in castor seed production. The most important cash crops of the year were, however, those crops which are also the staple foods of the people.

Non-Native Agriculture

Production did not increase to the same noteworthy extent as in the case of native agriculture. Scarcity of labour and the unavoidably high cost of bringing machinery and fertilisers into the highlands are among the special difficulties with which non-natives have to contend. Production of tobacco, pyrethrum and coffee was below the 1951 figures, but the tobacco crop was of higher quality than before. The areas growing these crops suffered more from the vagaries of the weather than many other parts of the Province. Non-native farmers' maize yields were, in common with that of African growers, higher than in 1951, but interest in wheat production declined. It was a fairly successful year for the tea industry, production of made tea being only slightly below the 1951 figure.

Tobacco

The Iringa tobacco crop showed a reduction in quantity but an improvement in quality as compared with 1951, largely due to improved methods of production and handling by the farmers. This is illustrated

by the following comparable figures for percentages of high grades (1950—22%, 1951—42%, 1952—50%) in the total production of leaf. The total crop this year, including bright scraps and shorts, amounted to 2,290,087 lb. compared with 2,736,190 lb. in 1951. The value of the crop to the growers is about £227,590. The main difficulties with which farmers had to contend were the shortage and inefficiency of labour, shortage of firewood, excessive early rain and some hail, eelworm and cutworm. There was also a tendency to excessive bottom growth leading to angular leaf spot and mildew on the sand leaves in many areas, and a drought in January led to the production of thin leaf. Despite these difficulties, most farmers produced a good percentage of bright leaf. It is estimated that seventy-five per cent of the farmers now use fertilisers and by 1953 this percentage should be over ninety per cent. Marketing has run fairly smoothly through the Southern Highlands Non-Native Tobacco Growers' Union and Messrs. Edwards, Goodwin and Company. 1,806,692 lb. were sold to the East African Tobacco Company Limited. 24,500 lb. to Switzerland, and 155,000 lb. to Germany. A small balance, made up of shorts and scraps, remains unsold.

Very little but Ehlers was grown, which suits the local conditions very well but has a limited market, and other suitable varieties must be found if the industry is to expand greatly.

Pyrethrum

There was a drop in production this year partly due to the long dry season and low temperatures in August and September. Most of the pyrethrum comes from Uwemba, and there is one farm in Mbeya. A trial planting at Lupembe gave 4,000 lb. of dried flowers with 1.5% pyrethrins from twenty acres. All pyrethrum is delivered to Messrs. Kenya Farmers' Association, Iringa, for baling and marketing. Figures of deliveries of dried flowers are:—

<i>Year</i>		<i>lb.</i>	<i>Year</i>		<i>lb.</i>
1949	...	380,000	1951	...	370,000
1950	...	344,000	1952	...	297,920

133 tons.

The pyrethrum growers are among the most progressive and co-operative farmers in the Province.

Tea

This has been a fairly successful year for tea production despite a severe drought in Mufindi early in the year. The quality is good and improved cultural practices have been carried out, including use of sulphate of ammonia, pruning on a four-year cycle, and replacement of old bushes by new Indian-type bushes. Emphasis at Mufindi is on increased production on a limited area and not on increased acreages. The estates in Tukuyu increased their area of tea by 226 acres.

Several non-natives have started planting tea for delivery of green leaf to the factories. At least three growers have already delivered leaf on contract. There is a suggestion that Africans in Rungwe might grow tea on the same basis. The Department did the necessary inspection of tea seed being exported from the Province to Kenya, Nyasaland and Portuguese East Africa. Figures for made-tea production from returns sent to this office are as follows:—

<i>Year</i>		<i>lb.</i>
1951	...	1,766,983
1952	...	1,750,798

Field Extension Work and Development Schemes

The control of soil erosion and the improvement of farming received considerable attention, the presence in the Province of an officer of the Department's Soil Conservation Service adding impetus. There was a satisfactory response on the part of non-native farmers, but the attitude of the African cultivator is so far generally one of indifference or opposition. Wind erosion and the often structureless nature of the soils in the Province are special problems. The plan for the development and conservation of the native lands in the Njombe District is, however, progressing well—soil conservation, assisted by windbreaks and more suitable farming methods, being the keynote. A comprehensive scheme for the Mbozi (Unyiha) area was drawn up.

The Rutenganio African smallholding scheme now has six holdings well established.

Trials and Experiments

Reference is made to the work of the Coffee Sub-Station at Mbozi and the Igumbiro Tobacco Farm elsewhere in this Section, while a summary of the work of the Agricultural Officer (Experiments) on pyrethrum, wheat and fertilisers in the Province is contained in Section III.

Jute, maple pea, short-term sorghums and maize, and linseed were the subject of trials. Jute trials will be extended. Oil palm, cacao, cashewnuts, robusta coffee and Queensland nut were raised from seed.

NOTE: References to a number of aspects of production in the Southern Highlands Province will be found in other Sections of this Report. Among the crops grown in the Province are: Maize, rice, pulses, sorghums and millets, wheat, cassava, sweet potatoes, tea, coffee, pyrethrum, tobacco, castor, sunflower, groundnuts, European potatoes, onions, essential oils.

SOUTHERN PROVINCE

Weather

Although in most districts the total rainfall for the year exceeded the average it was a most unsatisfactory season climatically. After an early and hopeful start to the rainy season there were unduly long dry spells which caused severe losses of young grain crops. Violent rainstorms and high winds followed, and a particularly violent storm of cyclone type caused severe losses of both annual and tree crops in its path.

African Food Supplies

Towards the end of the year local food shortages developed in those areas which had suffered most severely from the unsatisfactory weather conditions, and supplies of cassava, mainly from Newala, were made available for purchase.

African-grown Food Crops

Weather conditions were undoubtedly responsible for reduced yields of maize and sorghum but African growers in a number of areas also reduced their acreages of these crops, particularly where cashew nuts and other export crops were an alternative and more profitable source of cash. There were heavy sales of beans but this may have been more a reaction to the decontrol of the price than an indication of increased acreages.

Tobacco

(a) *Fire-cured*.—The decline in the production of fire-cured leaf in the Songea District from 1,185 tons in 1950, 604 tons in 1951 to approximately 400 tons in 1952 is attributed to competition from the sunflower crop the price of which was at a profitable level, and to difficulty in maintaining competent European staff in the field. It is reported that the Songea Native Tobacco Board has remedied the latter deficiency and has secured more field staff for the purpose of providing advice and assistance to the growers.

(b) *Flue-cured*.—Trials were continued at Mgwina and about one ton of leaf was produced. The development of this area is likely to be dependent upon the construction of a good all weather road.

In the Tunduru District the plan to continue the railway line from Lamusule Juu stimulated interest and seven settlers have made preparations for growing flue-cured tobacco north of the road between the rivers Muhuwesi and Mtetesi.

Other African-grown Cash Crops

A number of African food crops are normally marketed in quantity by cultivators, but apart from cassava from Newala and, to a smaller extent, pulses, such marketing was on a much reduced scale in 1952. Some 30,000 tons of dried cassava passed through the markets as a result of the good price offered, a favourable season for this crop, and the campaigns for increased planting in past years. The marketing of pulses more than doubled as compared with 1951.

Of the crops which are grown almost exclusively for export cashew nuts were outstanding, the 1952/53 season's crop being estimated at around 10,000 tons—a substantial increase. The marketing, and almost certainly the acreages, of coffee, sunflower, and castor seed

increased, but the marketing of tobacco, sesame, and groundnuts declined and there was little change in cotton production. Colombo Root production declined, the trade with the United States having been affected by weevil infestation in a number of consignments.

Non-Native Agriculture

It is reported that the farming activities of the Overseas Food Corporation at Nachingwea were hampered by the vagaries of the weather. Flue-cured tobacco production in the Province is referred to in an earlier paragraph.

In the coastal belt the storm of cyclone type caused considerable damage to sisal. The most serious effect was the twisting of the leaves—which caused weakening of the fibre and consequent down-grading. The export of sisal and tow was somewhat below the record 1951 figure of 13,000 tons.

Field Extension Work and Development Schemes

The Southern Province Development Plan has as its basic aim increased African and non-native production from all suitable land and officers of the Department were very fully occupied with a wide range of activities in this connection. Proposed cashewnut and cassava processing factories, the stocking of lakes with fish-fry, continued trials of flue-cured tobacco cultivation at Mgwina, and the supervision of a sizeable plot mechanical cultivation scheme operating in the Newala and Mikindani Districts and of light tractors (owned by the local Native Authorities) in most other districts were all matters for the attention of Departmental officers—and the list is by no means exhaustive. The activities of the Mahiwa Experimental Station are referred to elsewhere in this Report.

Other Matters

The Provincial Agricultural Officer made a special study of the need for, and the problems which would be encountered by, a produce grading and inspection service for cashew nuts and certain other produce. Plans are now well advanced for the start of such a service, and for the provision of fumigation facilities for Colombo Root.

NOTE: In other Sections of this Report will be found, under the appropriate headings, reference to a number of aspects of Southern Province production. Among the principal crops of the Province are: Cassava, maize, sorghums, and millets, pulses, rice, groundnuts, tobacco, sisal, coconuts, cashew nuts, castor seed, sunflower seed, cotton, gums, beeswax, coffee, wheat, and Colombo root.

WESTERN PROVINCE

Weather

A long dry spell lasting from mid-January until the end of February had a very serious effect on the growing crops, but fortunately there was then heavy rain, which continued until the end of May—later than is normal.

African Food Supplies

There was no shortage of food in the Province.

African-grown Food Crops

Both the maize and sorghum crops were smaller than in 1950 and 1951, but quite a substantial tonnage was marketed nevertheless. In the Ufipa District eleusine is the main food crop, and good yields were obtained. There were good crops of beans, groundnuts, and cassava. Apart from losses due to flooding in the Luiche delta the rice crop was excellent.

African-grown Cash Crops

There was again an increase in the tonnage of fire-cured tobacco grown in the Kibondo District. Sunflower production increased more than five-fold, due to the satisfactory price paid for the 1951 crop and the favourable weather. Palm kernel and palm oil production was normal.

Maize, eleusine, beans, and groundnuts were substantial sources of cash, production of the latter for sale having more than doubled. The usual market for eleusine and beans during recent years has been Northern Rhodesia, but in 1952 that country had a sufficiency of food and there was increased marketing in Tanganyika. About 750 tons of beans were, however, sold to Urundi.

Cassava yielded well, and the effect of the planting campaigns of past years is now very noticeable. A substantial trade in dried root for the Dar es Salaam and export markets has been built up.

Non-native Agriculture

Production from the four sisal estates was much the same as in previous years. The Overseas Food Corporation continued its work at Urambo.

Field Extension Work

A campaign for the tie-ridging of free-draining soil in order to conserve soil moisture was undertaken, and soil conservation measures to be adopted by cultivators now using ploughs were proposed in appropriate areas. Work on the Lugosye swamp drainage was attended by an extension of bean planting. An investigation of native produce markets was undertaken. Three African agricultural shows were organized, two being very successful.

Trials and Experiments

At Simbo Farm a plantation of 420 oil palms was made four years ago, and a number are already fruiting. Individual yields are being recorded and optimum spacing and suitable inter-crops are being

investigated. Mwanhala Farm has now been reorganized as a combined agricultural and veterinary experimental centre with a programme designed to shed light on problems of native land use.

NOTE: Reference is made under the appropriate headings in other Sections of this Report to many aspects of production in the Western Province. The following is a list, by no means exhaustive, of Western Province crops: Maize, sorghums and millets, rice, pulses, groundnuts, sunflower, cassava, tobacco, palm kernels and palm oil, sisal, gums, onions and vegetables, kapok, beeswax and honey.

AGRICULTURAL STATIONS AND EXPERIMENTAL WORK

THE COFFEE RESEARCH STATION, LYAMUNGU

No new trials were planted on the Station during the year, but four new clonal selection trials were laid out on native land and non-native estates in Moshi, Arusha and Oldeani. Recording of the twenty-seven clonal and selection trials, the four agronomic trials and the three pruning and training trials on the Station was continued. Satisfactory analysis of the season's figures has confirmed the trends of previous years and the Station is now in a position to make firm recommendations regarding some of the fundamental aspects of coffee cultivation. The most outstanding of the findings are: the increase in yield which results from multiple-stem rather than single-stem pruning; the yield increase which results from using banana-trash mulch or moderate irrigation (or a combination of both) or from applying compost, and the yield increases which result from the use of seedlings from selected trees or of vegetatively propagated plants of a high-yielding clone.

Treatments in the mulching and irrigation trials have now been altered in order to determine whether levels of these treatments lower than those previously recommended can be as effective, or nearly so. There are now indications that pruning single-stem coffee immediately after harvesting rather than delaying this operation for some months results in increased yield. Some remarkably high yields were obtained from the clonal and seedling progeny of high-yielding trees, there being several instances among the seedlings of yields exceeding one ton of clean coffee per acre, and in one instance a yield at the rate of 31.75 cwts. of clean coffee per acre was recorded.

Investigations continued on the problems of "fruity", "onion" and "woody" flavours, storage under conditions of high humidity being absolved from causing the latter. There was an indication that susceptibility to "onion" flavour may be a characteristic of certain selections.

Work was commenced on devising a process for removing the nucilage from pulped coffee by enzyme or caustic action instead of by the normal fermentation process.

Both *Hemeleia vastatrix* and *Antestia* spp. were present to an unusual extent early in the year, but were fully controlled by routine spraying.

Vegetative propagation continued, though restricted by the heavy infection of mother-trees by *Hemeleia vastatrix* early in the year. Beta-indolyl actetic acid is now under trial as a rooting aid.

A start was made with the crossing of the most promising clones.

The station herd was maintained, dormancy-breaking sprays were successfully used in the fruit-tree orchard, *Cynodon plectostachyum* was established on twenty-seven acres of cleared land on the recently acquired Lyamungu Estate, and a number of varieties of cereals were tried elsewhere on this estate—which will eventually be planted with coffee.

THE MBOSI COFFEE SUB-STATION, SOUTHERN HIGHLANDS PROVINCE

The variety, spacing and establishment trials were maintained. These trials have not yet reached the stage when any results are obtainable. The nursery for raising seedlings of new selections was maintained and a second nursery was prepared. The greenhouse was in use for studying the effect of temperature on coffee, as part of the investigation of the "black tip" or "wither tip" disorder.

The Government Chemist has co-operated with the Senior Research Officer, Lyamungu Coffee Research Station, in the "black tip" investigation. Coffee grown under greenhouse conditions was almost entirely free of "black tip" up to flowering, and observations continue. Sheltering mature coffee from sun or wind, or both, did not prevent the occurrence of the disorder. Recent work of the Government Chemist suggests that a manganese-induced calcium deficiency may be involved.

In addition to coffee work the Station serves as a site for observation plots of other crops. *Desmodium distortum*, buckwheat, Katumbili maize, linseed, lupins and vetches, *Lespedeza*, Niger oilseed, oats and kudzu were sown. Good results were obtained with buckwheat, Niger oilseed, oats and kudzu. Queensland nuts and citrus and deciduous fruits did well, but pecan nuts seem likely to prove unsuited to the area.

The water supply to the station was improved, and minor building operations carried out.

THE BUKOBA COFFEE SUB-STATION, MARUKU

The banana establishment trial on this station is now showing some interesting results, very noticeable improvements in growth resulting from the application of farmyard manure and grass mulches.

Grass mowing for mulching, and the production of farmyard manure, are proceeding satisfactorily. It has been found that heavy grazing on limited areas of land, preceded by mowing or burning of the coarse grasses, results in a rapid improvement in the stock carrying capacity of the land.

Little expansion of the coffee area in this district can take place until conditions on the open land are first made suitable for the crop and it is for this reason that the work now in progress at Maruku is concerned more with fertility-building and the cultivation of such nurse crops as banana than with actual coffee cultivation.

SISAL RESEARCH STATION, MLINGANO

The Tanganyika Sisal Growers' Association's Research Station at Mlingano near Tanga is staffed partly by direct employees of the Association and partly by members of the Department of Agriculture on secondment. The former include the Soil Chemist and a Scientific Assistant. The Senior Research Officer, the Plant Physiologist, two Agricultural Assistants and seven Junior Service officers are carried on Departmental establishment. All expenses including salaries are met by the Tanganyika Sisal Growers' Association.

A full report including detailed accounts of the experiments and results is published by the Association but a fuller version of this summary will be found in Section III.

Additions to buildings included a number of minor works and the enlargement of the labour camp by thirty-two new semi-detached quarters for Africans. The fitting-out of the station made further progress and when all items have arrived there is no doubt that the station will be very well equipped. The medium spectrograph, a micro analytical balance and a quantity of lesser apparatus arrived, leaving the large spectrograph still on order. Minor additions were made to the station's field equipment and the library organization improved. Twenty-five hectares of land were newly opened up.

It was a dry year at the station, rainfall being 32.98 inches (the eighteen-year average being 46.52 inches).

The current programme of experimental work comprises thirty-five field trials which total includes a substantial number of off-station trials sited on estates suitably located to provide a range of soil and climatic types. Twenty-seven of these experiments are concerned with problems of manuring sisal and maintaining soil fertility.

The Station also put down insecticide trials for Dr. Russell of Oxford University and maintained experiments initiated by Messrs. Pest Control Limited.

Sisal has a life-span of from four to ten years or more and for this reason experimental results cannot be obtained rapidly, but steady progress is being made. Plant and soil analyses and observation of foliar symptoms give some indication of responses to treatments prior to complete cutting records being available, and it is therefore possible—after a study of all interim findings—to comment on a number of uncompleted trials. The *cultivation trial*, in which first cycle yields favoured clean weeding, showed a marked decline in yield during the second cycle on clean weeded land. Where a cover crop was grown the decline in yield was less, but it is inferred that a vegetal cover on the soil is not enough by itself to maintain fertility—all treatments, apart from the unweeded plot, showing foliar symptoms of nutrient deficiencies. The unweeded plot, though healthy in appearance, has yielded a very small crop.

In the *spacing trial* first cycle results showed that total yield and plant population were closely related, but in the second cycle plots with densities above 5,000 plants per hectare appeared to be showing a fall in yield not apparent in the lower density plots. In the third cycle, however, the low density plots showed unsatisfactory growth. Positive recommendations cannot be made on these interim findings.

In the *spacing-and-cutting trials* it was confirmed that very heavy early cutting is always harmful. The optimum combination of density and cutting cycle, out of the twenty-seven combinations under trial, awaits the accumulation of further data for determination.

In the *fertility trial* nine systems of rotating sisal with various resting crops are being tried. It is too early to quote any findings, and the same can be said for the *grass rotational trial* which has as its object the restoration of the fertility of “sisalworn” land by means of grasses and fertilisers.

The *factorial manurial trial* is of fundamental importance to all work on the manuring of sisal and is now beginning to show some interesting interim effects. The trial consists of plots treated with dressings of lime, nitrogen, phosphate and potash in all combinations and each at three rates. All but the lime are applied annually. Nitrogen has hastened growth to levels normally seen on virgin land, the equivalent of between five and six tons of fibre per hectare having been obtained in the three and a half years since planting from five of the plots receiving nitrogen. Excess nitrogen in the form of sulphate of ammonia is seen to cause chlorosis, especially where lime or phosphate were not applied. Tests show that fertiliser treatments have had no effect on fibre fineness so far. Observations of chlorotic mottlings and “purple leaf-tip roll” are being made, as a knowledge of the soil conditions leading to such are expected to be of value to those concerned with the manuring of sisal plantations.

The *fertilisers placement trial* now indicates that placement in the rows, rather than broadcasting or placing between the rows, is more effective.

The *mulching trial* indicates that mulches can be of some benefit in sisal cultivation but that mulches alone may not maintain fibre yields on exhausted soils.

In the *ridging trial* sisal on ridges grew faster and yielded more heavily than sisal on flat during the early stages, but seems likely to pole out sooner.

In the *interplanting trial* the effect on sisal yields of interplanted food crops is being observed. Sorghum depressed sisal yields, maize did not do so significantly and beans neither depressed nor raised yields.

The *bulbil nursery trial* showed the advantage of wide spacing and the application of old or fresh sisal waste.

A *sisal waste manurial trial* was put down in 1952 to ascertain the value of sisal waste for improving land which has grown sisal for many years. Off-station work included two grass-rotational-and-manurial trials, but difficulty in obtaining establishment of sisal in one case and grass in the other will delay results. The "banding disease" manurial trial, dating back to 1947, now shows a very large response to application of sulphate of potash and a new trial was started to determine the economic rate of application. A spacing-and-cutting trial in the Kilosa District has, apart from higher fibre yields throughout, followed the trend of the similar trial at Mlingano. Exploratory manurial trials were conducted on six different soil types in the Tanga Province and there are four fertiliser demonstration plots on Tanga and Central Line estates.

The Plant Physiologist worked on "banding disease", "purple leaf-tip", chlorotic mottle, leaf injection, sand culture, root promoting substances, the control of bole-rot, and fibre counts, virtually all his work being directly related to trials in progress.

The Soil Chemist began soil sampling on sisal estates, visiting thirty-seven and taking 677 samples. A further 755 soil samples were taken in connection with station and off-station trials. Nitrogen and pH. determinations on all samples were completed and phosphate determinations were commenced. Work was also done on evaporation and percolation rates and the pH. of fresh and composted sisal waste.

Seed of twelve inter-specific crosses of F₂ *Agave amaniensis* x *Agave angustifolia* hybrids was sown. The Station is also now in charge of a number of hybrids growing at Amani.

The Station's citrus nursery suffered a severe set-back owing to the drought, but 3,246 trees were sold to estates and other purchasers and deliveries will be started again by the 1953 rains.

Ramie and hibiscus were under trial but the dry weather seriously affected growth. The Station maintains sizeable stocks of a number of cover crops and of elephant grass.

UKIRIGURU EXPERIMENTAL STATION AND LUBAGA SUB-STATION

New laboratories were completed at Ukiriguru early in the year. The scientific officers working for the Empire Cotton Growing Corporation report fully on their year's progress in Section III of this Report, as does the Department's Botanist.

The following paragraphs are a summary of the main results of the year's work on cotton.

Three year's "tumbledown" fallow has again been shown to restore fertility better than a planted grass fallow; and to do so in the first cropping year.

Responses to organic manuring have fallen below the five per cent significance level in the eight seasons after application, but this with the indicator crop millet, in a very difficult year for millet growing.

Nitrogen applied to cotton between January and March showed no difference in response to time of application. The effect of nitrogen was less in the presence of organic manure.

Tie-ridging may have depressed cotton yields slightly in comparison with ridges not tied in an exceptionally wet season.

Preliminary trials of cotton seed treatment against bacterial blight infection showed that a considerable degree of control was possible by this means. Stem lesion counts showed, however, that young seedlings from acid-treated seed were quickly infected where cotton had been grown the previous season, stressing the importance of trash-borne infection and its control by adequate rotation of crops. Two seasons under a grain crop seem to be the minimum period required to control trash infection.

Uk. 48 and Uk. 51 have yielded better than Uk. 46 in extensive trials throughout the Province.

By growing cotton during the dry season, a generation has been gained in the programme of crossing with Albar 51.

The Department's Botanist was working in 1952 on sorghums, rice and cassava. He has found that straightforward selection in sorghums is unproductive of the combination of characteristics which he is seeking and has started a programme of hybridization. The object of this programme is to obtain sorghum varieties which cultivators will wish to grow in place of maize in areas where the latter is unreliable. Good yield, a large and palatable grain, a long storage

life, resistance to parasitization by *Striga hermonthica*, and resistance to bird damage and attack by grain smut are the main characteristics sought. Considerable progress has been made with the witchweed (*Striga hermonthica*) problems, it being now fairly certain that the sorghum variety Dobbs possesses a degree of resistance to attack by the parasite.

In his work on rice the Botanist has confined himself to straightforward selection in his search for varieties which are superior to the local "Kahogo" in straw length and freedom shedding, with a yield and quality which are at least as good. Four hundred and thirty-seven selections and re-selections made in 1951 were grown out in progeny rows, and 441 re-selections were made from these and from varietal bulks. Sixty-seven of the best 1951 selections, together with the best of the 1950 selections, were sown in a 169-strain sextuple lattice trial. The best strains from the 1950 trials were also sown in a twenty-five-strain variety trial with local "Kahogo" and "Afaa Mwanza" as controls.

In his report the Botanist quotes the results of a cassava variety trial in which all the mosaic-resistant varieties originating from Amani yielded far more heavily than the local clone, but were out-yielded by the bitter (and vermin resistant) clone grown in Tabora under the name "Liongo". These results correspond with those obtained in a similar trial in 1950.

NOTE: Details of the year's progress at the Department's Ukiriguru Training Centre will be found under the heading "Agricultural Education" elsewhere in Section II of this Report.

THE ILONGA AGRICULTURAL STATION AND THE WORK OF THE EMPIRE COTTON GROWING CORPORATION IN THE EASTERN PROVINCE

The work of the Empire Cotton Growing Corporation in the Eastern Province continued on the Department's Ilonga Agricultural Station, and on four district plots. Cotton selection was maintained, a collection of 118 selections from 1951 and a number of strains in small bulk form being carried forward. The strain 47/10 was planted on the station with a view to bulking for distribution throughout the Province in place of the present local seed. This strain has attractive lint qualities, uniformity of length and good strength.

Much attention was given to cotton pest control. A randomized-block insecticide trial was laid out in order to follow up and confirm the very promising results obtained in 1950 and 1951 in the control of *Heliothis armigera* (American-bollworm) by means of a dust containing ten per cent DDT and aphicide, the latter being three per cent gamma isomer benzene hexachloride in talc. Plots were 1/10 acre in size, planted with strain 47/10 spaced 3ft. by 3ft. with two plants per

hill. Borders of tall sorghums were used to check dust drift. There were seven replications of the six treatments and controls. Treatments were designed to give information on the optimum time of dusting and the minimum aphicide content of the dust sufficient for the purpose. Timing was based on larval counts, counts of "flared" squares and flower counts. Very striking confirmation of previous results was obtained, dusting increasing the yield of seed cotton from thirteen pounds per acre of seed cotton to harvests of between eight hundred and nearly sixteen hundred pounds per acre. There was, as these figures indicate, an exceptionally heavy attack of American bollworm on the Station during the season, the infestation on control plots reaching a peak of over 28,000 per acre and attaining the remarkable figure of 44,000 per acre on non-experimental undusted areas nearby. Such populations result in virtual destruction of crop. A low-volume spraying trial was conducted by a commercial firm, using sprays containing DDT only. Some control of American bollworm was obtained, but owing to difficulty in obtaining adequate cover with the equipment available, and the lack of an aphicide, results were much less satisfactory than in the dusting trial. Owing to the destruction of predators by DDT the incorporation of aphicide seems essential.

The progress report of the Empire Cotton Growing Corporation for the Eastern Province is printed in Section III of this Report, as is the report of the Agricultural Officer in charge of the Ilonga Agricultural Station. In this latter report is raised that question of applying the successful DDT/BHC/talc dust to native and non-native crops in the Province, and the need, for these purposes, of suitable hand and power dusters. An Entomologist proceeding on leave to the United Kingdom has been charged with the duty of making enquiries for these and of purchasing machines.

Other work at the Ilonga Station was in charge of the Agricultural Officer, a programme drawn up early in the year providing for the improvement and bulking of maize and sorghum suitable for Provincial conditions, the observation and bulking of virus-resistant cassava clones, the investigation of certain other crops, and agronomic trials.

A start was made improving Eksteen maize by Harland's method, observations on forty-three varieties of sorghum were recorded, twenty-one clones of cassava were propagated, four soya bean varieties and forty hibiscus varieties were sown for observation, and observation plots of Lucerne and Kudzu were planted.

Two cottage-type houses were completed; an office, laboratories, insectary and dispensary were built and a start was made with erecting houses for staff of the Colonial Insecticide Research Unit due at the Station in the coming year. Twenty acres of heavy bush were cleared, and two tractors and sundry implements purchased.

Thirty-eighty tons of Katumbili maize, grown on the Station, were sold to native and non-native growers for seed. This service is much appreciated by growers.

FIELD EXPERIMENTS, SOUTHERN HIGHLANDS

The Agricultural Officer (Experiments) carried out variety and fertilizer trials on wheat, planned and analysed a number of trials with pyrethrum which were largely laid out and recorded by farmers themselves, and carried out a number of tobacco trials. The latter are referred to under the heading "Igumbiro Tobacco Farms". Detailed information on the wheat trials will be found in the annual report of the Agricultural Officer (Experiments) which is printed in Section III of this Report. A detailed report on the pyrethrum trials is available on request.

The main emphasis in the wheat variety trials was on finding varieties suitable for various altitudes and were carried out and on the results definite recommendations can now be made for two altitude-ranges in the Iringa District and one in the Mbeya District. Two $3 \times 3 \times 3$ partially confounded factorial experiments in the Iringa District confirmed the 1951 finding that dung supplemented by artificial fertilizer gave the most valuable increase in wheat yields but indicated that the supplement could be in the form of either sulphate of ammonia or superphosphate. Trials in the Mbeya District were notable for the highly significant response to dung, supplementary artificials being uneconomic.

Rate-of-seedling and time-of-planting trials revealed that 100 lb. of seed wheat per acre sown in mid-February should be the generally recommended procedure.

Pyrethrum trials included fertilizer, time-of planting, spacing, planting material, cultivation, and picking *v.* reaping experiments. Two good recorders were available to assist farmers with the field work of these trials, the results of which are given in brief below.

Fertilizer trials.—Dressings of superphosphate in five $3 \times 3 \times 3$ partially confounded factorial experiments with a plot size of 1/100 acre gave considerable increases over control, these increases being significant on a number of farms. Indications as to the most economic dressing on each farm have been obtained, but further work will be required on this aspect. Neither sulphate of ammonia nor lime gave significant increases in yield, and phosphate in the form of soda phosphate appears to be of little value.

Time of Planting trials.—A 4×4 Latin square experiment with plots of 1/145 acre has showed on analyses of 1951 and 1952 results that January plantings were significantly better than later plantings. The 1952 results, analysed alone, showed no significant difference, and a

randomized block trial on the same farm showed significantly higher yields from November plantings. Results are, of course, very closely dependent on seasonal variations in rainfall distribution.

Spacing trials.—A 4×4 Latin square experiment planted in 1951 with plots of $1/200$ acre gave non-significant results but there were indications that six inches spacing, followed by thinning to twelve inches, approached closer to the optimum spacing than other treatments.

Cultivation trial.—A randomized block experiment confirmed previous findings, no significant increase in yield being obtained by inter-row cultivation during the dry season. A similar experiment revealed no significant difference in yields after land preparation by hand and by rotary cultivator.

Picking trial.—Two 5×5 Latin square experiments showed significant increases in the yield of dried flowers when the plot is stripped of all flowers every three weeks rather than picked at longer intervals, but the percentage of pyrethrins was higher when picking was at longer intervals and some indication was obtained of the intervals between pickings which are likely to be most economic.

Planting Material trial.—A randomized block experiment with tea replications showed that no significant yield increase results from careful splitting.

From this year's trials and others carried out previously, it is now clear that a suitable method of land preparation is to ridge over a dressing of five tons of compost and "place" from 150 to 200 lb. of double superphosphate per acre in the ridges, before planting.

IGUMBIRO TOBACCO FARM, SOUTHERN HIGHLANDS PROVINCE

This farm is proving to be too small for the growing programme of work on the important flue-cured tobacco crop, but it remained the centre for the 1952 experiments and, in addition, was used for the production of nearly 2,000 ounces of Ehlers tobacco seed for sale to farmers in 1953 and 1954.

The tobacco experiments were supervised by the Agricultural Officer (Experiments), and included variety, fertilizer, spacing, and eel-worm and cutworm control trials, in continuation and confirmation of work in previous years. In the variety trial both Yellow Special and Delcrest showed promise, and small supplies of seed of these will be available to farmers who may wish to try them. It cannot, however, be said that either variety is a recommended alternative to the standard variety Ehlers. Delcrest was notable for a high percentage of top-grade leaf. In the fertilizer trial Ehlers gave the best response, both as to yield and percentage of high grades, where a mixture of superphosphate, sulphate of ammonia and potash with a N: P: K ratio of 3 (or 6): 10: 16 was used. Results were not significant statistically in

spite of a difference of 900 lb. of leaf per acre between the most beneficial and the least beneficial treatments. In the spacing trial no significant difference in yield resulted from small variations in spacing. In the eelworm control experiment two proprietary soil fumigants, applied by injection, resulted in yields three and four times greater than yields on untreated plots—but again results were not significant when analysed. Results of the cut-worm control trial were still pending at the end of the year.

MECHANIZATION—GENERAL

Work has continued on mechanical cultivation schemes and trials and has yielded further useful information. So far data has been accumulated only on standard machines, which have been used under a very considerable range of conditions with little or no modification. The design of new or modified machines for special conditions has hardly yet begun, but the successful development of a disc ridger from a standard implement for the construction of suitable ridges for Sukumaland conditions is a notable beginning. Work is also well advanced with the prototype of a suitable ridger for ox-draft. Trials indicate that mechanization is likely to enable certain intractable soils to be brought under cultivation, soils which previously could not be cultivated by the peasant farmer.

There is continued interest in the purchase of light wheel tractors by Africans, and their use for contract ploughing in the Lake Province has served as a useful demonstration, but the use of this size of tractor is restricted to light, easy working soils and they have proved insufficiently robust for most conditions encountered, especially in District ploughing schemes.

A full year's work on two fully mechanized rice schemes, one under irrigation, the other with rain grown paddy, has contributed most useful information on techniques and implements. One implement which has proved of very considerable use is the heavy off-set disc-harrow. This robust disc-harrow can be used under a wide range of conditions except the wettest. Standard grain drills have proved entirely satisfactory on these rice schemes.

Although wheeled self-propelled combines were used with success in the irrigated rice schemes, it was found essential to use half-track combines in the Kilombero Valley, where the soils dry out very slowly, a condition aggravated by the present unevenness of some of the land. A notable feature was the way in which these combines worked in a few very weedy patches of rice, producing a first class sample of paddy. It is possible that swathers, at first believed essential, may prove unnecessary for dealing with dirty crops.

Farmers and Planters continue to increase the use of machinery to overcome labour shortage. Heavy brush cutters are coming into prominence in the Sisal industry for breaking up old sisal and small bush prior to ploughing. Large singlefurrow mouldboard ploughs have been very successfully used on new wheat farms for ploughing under heavy growths of *Lippia* sage brush, thus reducing preliminary handwork to a minimum. As a result of promising trials of herbicides in the Northern Province farmers are buying low-volume sprayers.

Trials of maize pickers have not been entirely satisfactory. This is mainly due to the high proportion of ripening maize plants that fall over from termite damage and other causes before the crop is ready for the harvester. There have also been relatively minor mechanical failures the effect of which has been aggravated by delays in receiving spare parts.

The successful progress of mechanization under African conditions is as much a human as a mechanical problem. Too often expensive machinery is immobilized at vital times in the farming calendar due to sheer carelessness and inefficiency on the part of the driver. Break-downs, however, are not always the driver's fault. Unfortunately the pressure to mechanize has led to machines being purchased by land owners who know nothing of machinery and are themselves incapable of training native drivers in correct maintenance and efficient use of tractor and implement. There is a great need for more training facilities for native tractor drivers and there is scope for more post-sales assistance and instruction by machinery firms.

With the possible exception of the Northern Province, mechanization in the Territory continues to suffer from inadequate spares service. Delays in receiving parts are often unavoidable through distance from the agent, but too often agents are unable to supply some of the commonest parts through inadequate stocking arrangements.

MECHANICAL CULTIVATION SCHEMES

With the exception of the Rufiji Native Authority ploughing scheme the many schemes which proved a ploughing service for Africans are still only in the pilot or propaganda stage. There was an increased demand for tractor ploughing in most schemes, despite some discontent caused by higher fees. In the Rufiji the ploughing unit was increased by four track tractors and the record area of 7,720 acres ploughed. The two pilot mechanical units in the Lake Province dealt with 1,500 acres. A full range of mechanical operations can be done by these units, including ridging, ripping, and seeding, and it is the aim of the scheme eventually to supply a complete service at village level. In the Southern Province, where good crop results have led to more

enthusiasm, and in some cases have overcome reluctance to pay fees in advance, 817 acres were ploughed by two wheeled tractors. Six other schemes ploughed a total of 1,280 acres. Among these are the Uluguru and Usambara schemes for the improvement of land-usage, where progress with ploughing expansion areas has been slow. The hill-dwellers have both to be attracted to the lower areas and taught to appreciate the advantages of having their land ploughed.

In addition to schemes sponsored by Government, a few Chiefs own tractors and do contract ploughing. In one case three tractors are being operated by Chiefs with their people as shareholders in each instance, and are being used mainly for food crops, although cash crops are also being planted to help cover costs. A small area of land was ploughed in the Pare District by a contractor, but there has not been the hoped-for development of this approach to a ploughing service.

Except for the Lake Province mechanical units, which have been financed by the Lake Province Cotton Committee, schemes have been Native Authority undertakings, the machinery purchased with loans from Central Government, administered by District Commissioners, and the field operations carried out under the supervision of officers of the Department of Agriculture.

The Rufiji ploughing scheme, which is the most advanced of all, started in 1948 with free ploughing of 600 acres. Its object is to increase the production of rice in an area of 100,000 acres of potential and actual rice-land where the area under cultivation is limited by the cultivators' dependence on the hoe. The land ploughed has largely been new land being brought into cultivation for the first year of cropping. A grouping of lands of individual farmers is followed to give large blocks for ploughing, and the allocation of their share of ploughed land to cultivators is done by rudimentary societies formed from those who have paid ploughing charges.

The first demonstration roused considerable enthusiasm and there has been an annual increase in the size of the tractor force employed, until in 1952 eight crawler tractors have ploughed the record acreage given above, supported by two wheeled tractors and two lorries for transport. Until then field operations had been supervised by an officer of the Department of Agriculture, but in 1952 the Native Authority employed its own European field supervisor.

The raising of the ploughing fees in 1952 caused a certain amount of discontent which resulted in delays in orders for ploughing. Various difficulties were encountered during the season. The rank growth of vegetation on previously uncultivated land caused numerous delays and breakages. Much of the land had to be ploughed in low gear, resulting in high fuel consumption and occasionally in double

ploughing. Due to staff difficulties the daily three eight-hour shifts had to be reduced to a two-shift basis. It was difficult to persuade the Africans to cut and burn tall grass before the arrival of the ploughing units.

There is still much to be done to perfect the working of this scheme and to put it on an economic basis. It is gaining in popularity and it is interesting to note that the record acreage was achieved when money was short following a disastrous flood season which caused almost total destruction of the flood-plain paddy crop.

In the past the charges made have been well below the costs of the service and, in an attempt to make schemes economic, all rates were raised during the year to Shs. 35/- or Shs. 40/- per acre. Even at these rates most schemes failed to cover costs. This is due to a number of factors mostly arising from the nature of what is being attempted.

Most district schemes are equipped with only one or two tractors, and these have not always been suitable for the tough conditions encountered. Such a small unit has not warranted the full time supervision of a European, although for the efficient use of the machinery and the proper maintenance of tractors such close supervision is really essential. Operators are inexpert and the full output of tractor and implement is not achieved. Much time has been lost through breakdowns which might have been avoided, heavy charges have been incurred for repairs and spare parts, which have often been unobtainable at short notice. The small size of the units has made it uneconomic to carry large stocks of spare parts.

Breakages are increased due to improperly stumped ground. As the average piece of African land was never cleared for tractor work, this factor will put a considerable brake on the speed with which schemes can be enlarged in many areas.

Those who wish to make use of the ploughing service are as yet too widely scattered, which entails high transport costs moving machinery from place to place. This is aggravated by cultivators not putting in orders for ploughing early enough, which prevents an economic planning of work to be done, and the full use of tractor power available.

Until the present scope of the schemes can be greatly extended, thus enabling some of the causes of high costs to be overcome, and until the terms of repayment of loans, interest charges and depreciation are brought nearer to common practice, there seems little prospect of the costs being covered without charging quite unrealistic rates. Subsidization of the schemes remains a necessity for some time to come if cultivators are not to be discouraged from using them, thus preventing expansion to the stage where realistic charges can cover costs.

GOVERNMENT FOOD FARMS

Kilangali Food Farm

This project was closed down at the end of the paddy harvest in August. Although the average yield of 969 kgs. per acre over the 140 acres cultivated was almost up to expectation, a number of factors indicated that the scheme could not be expanded to the expected size without very heavy capital expenditure over and above the original estimates. In the first place it soon became apparent that the selected area could not be drained at will and there was even a danger of serious flooding during times of heavy rainfall. A continuation of the scheme would have necessitated the use of higher land with a considerably heavier tree growth, and clearing costs would have been quadrupled. The higher land would not have been commanded by the existing weir and furrow; a new headworks with a long canal would have been necessary, and this would have involved purchasing land now under sisal. There was also a possibility of the land becoming saline if effective drainage could not be assured. Added to these disadvantages the site of the temporary living quarters and workshops proved to be quite unsuitable for permanent development as it was badly drained and unhealthy. The only suitable alternative lay at a long distance from the nearest point on the proposed farm, and would have been very expensive to develop satisfactorily. In making the decision to close this project it was realised that any large mechanized rice scheme involves high capital expenditure, but it was thought advisable to concentrate for the present on land which requires little, if any, clearing, and investigations are therefore being confined to a pilot scheme in the Kilombero valley. The Kilangali site is now being utilized as a ranch for immature stock, and the irrigation system should prove very valuable for producing green fodder during the dry season.

Lupiro/Kivukoni

Trials at Lupiro and Kivukoni continued. (The Report of the Officer in charge, Government Food Farms, for the season 1951/52 is printed in Section III of this Report).

MAHIWA EXPERIMENT STATION (SOUTHERN PROVINCE)

The main work of this Station is concerned with rice. 1952 was a favourable year, the crops being notably free from pests and diseases. The experimental programme was reorganized for the 1952 season as follows: Replicated random-block variety manurial, and method-of-planting trials were conducted in twelve rice dams. The variety trial occupied seven dams, there being eight replications and the plots being 33ft. x 11ft. Mahiwa strains and bulks were sown, yields were recorded, and results significant at the five per cent level were obtained.

Such a trial as this is fundamental to work on rice improvement. The manurial trial occupied three dams, there being six replications and the plots being one twenty-fourth of an acre in extent. The trial was designed to compare the response of rice to applications of a complete (NPK) artificial fertilizer and applications of farmyard manure, with unmanured plots as control. Yields indicated a significant response to applications of farmyard manure, at the 0.1% level as regards farmyard manure *v.* control and at the 1.0% level as regards farmyard *v.* artificial fertilizer. There was no significant response to the application of the complete artificial fertilizer. The method-of-planting trial was designed to compare the effect on time of maturity and yield of transplanting, dibbling-in seed, and broadcasting. It occupied two dams, there being eight replications and the plot size being one forty-eighth of an acre. Dibbled plots showed a general yellowing in the early stages of growth but this effect was transient. Analysis of yields revealed no significant difference between the methods of planting, and the times of maturity were uniform. The trial will be repeated, as differences may well be significant in a less favourable season.

In addition to the above trials, observations were made on the suitability of two local rices for non-irrigated cultivation. Seventeen Mahiwa selections were observed for tillering and growth and a number of dams were in use for growing seed for distribution. Five varieties yielded well at between 2,010 and 3,310 lb. per acre and the average yield from the seed production dams was 2,026 lb. per acre.

A long-term Malayan variety of rice was planted in association with *Tilapia nilotica* in one dam, the rice being harvested after 193 days and the fish after 231 days. The rice yielded well but the harvest of fish was below expectations and further work on the production of fish in association with rice is obviously required.

Sorghum, cassava, soya bean, hibiscus, sesame and loofah were the subject of trials and observations. Cassava clones originating from Amani were planted in a randomized block trial with four replications, fresh-weight yields ranging from six and a half tons to nearly eleven and a half tons per acre. As elsewhere in the Territory Hibiscus cannabinus grown from imported seed appeared to be more promising than others under trial. Some good samples of loofah were grown and retted and conditions at Mahiwa appear to be suitable for this crop. Selected seed from the 1951 "Lindi White" sesame crop was sown and a small harvest obtained despite severe aphid attack. Sorghum observations were inconclusive and it has been decided to abandon further attempts to cultivate soya bean, which again yielded poorly.

An oil palm plot is maintained, maize, cow peas, beans and vegetables are grown, and a small herd of cattle is kept.

MWABAGOLE RICE STATION

Work at this station is in charge of the Botanist, Ukiriguru, and is included in his annual report, printed in Section III of this Report, and referred to in the note on Ukiriguru elsewhere in this Section.

COAST AGRICULTURAL STATION, CHAMBEZI

Work on this Station started in 1951 and during the year under review progress was made with preparing the Station for experimental work.

A house for the officer in charge was completed, one for the assistant was renovated, quarters for clerks and recorders were built, and a store and office were erected. Roads and firebreaks have been made and boundaries checked.

Some 200 acres of the existing coconuts have been cleared of undergrowth and disc-harrowed and 110 acres of derelict sisal and bush cleared and ploughed for coconut and annual-crop planting.

Individual recordings of pickings from all coconuts in a 200 acre block were commenced; a nursery of some 12,000 nuts was started; preliminary observation trials of Hibiscus, sugarcane, pineapple, loofah and hermaphrodite papaw were planted. Dry weather hampered these plantings.

Coconuts to the value of some 28,000/- were sold, the number of live coconut trees per acre on the long-neglected estates which make up the Station averaging less than forty.

DODOMA TRIBAL FARM

This small Station is used for testing the suitability of crops for native cultivation and for investigating methods of cultivation. Maize, sorghum, green gram, cowpea, millet, castor and groundnuts were grown in 1952. Useful indications were obtained as to suitable dwarf sorghums for the area; it was confirmed that the traditional native planting period for cowpea is usually the best choice; evidence was obtained that higher yields result from sowing large castor seed rather than small; short-term groundnut varieties out-yielded the local native variety. Significant yield increases in millet resulted from planting on tied ridges as compared with planting on the flat.

The cattle herd totalled ninety-four at the end of the year.

KUNGULUI FARM, LUSHOTO

This small Station continued to be used primarily for the trial of potato varieties imported from the Scottish Society for Research in Plant Breeding. The main aim of the work is to obtain a potato variety which is highly resistant, or immune, to attack by the several strains of

Phytophthora infestans which occur in the territory. One variety, imported in 1949, has shown this characteristic and yields moderately well. Another variety, though susceptible, has proved to be very high yielding. Twenty-two varieties were planted in the short rains of 1951/52, and fourteen new importations were planted in April 1952. These new importations did not show promise. The variety mentioned above which shows resistance (or possibly immunity) to *P. infestans* is now to be multiplied in potato-growing areas.

MOROGORO FARM

The main work during the year was the bulking-up of short-term maize varieties and selecting from Enyanza sorghum. Six acres of new land were broken and a total of 13.3 acres of maize and 9.4 acres of sorghum were grown, in addition to cassava, sweet potatoes and the observation and trial plots.

Nine hundred kg. of selected Durum, Eksteen, and Katumbili maize seed were sold or distributed to farmers and other Stations. Selections of dwarf types were made from the Enyanza sorghum for further planting.

Fifteen clones of cassava were maintained and some 90,000 four-foot sticks were distributed for native planting. Three lorry-loads of sweet potato cuttings were distributed.

The sugarcane varieties POJ/28/27 and C.O. 421 were propagated for eventual distribution.

18,549 citrus and other fruit trees and ornamentals were despatched by the nursery.

Observation plots of hibiscus, pasture grasses and loofahs were planted. As elsewhere in the Territory imported seed of *Hibiscus cannabinus* gave the most promising result. Seven species of grasses new to the farm were obtained from the Soil Conservation Service and planted for observation, while *Digitaria swazilandensis* and *Bracharia brizanthus* were found promising for facing bench terraces. Loofahs were grown from seed obtained from Japan, but results were poor and it is unlikely that the crop can be grown successfully in the area.

A simple non-replicated yield trial of fifteen cassava clones was harvested. In this there were seven clones originating from Amani, and others from the coast, Zanzibar, the Gold Coast and the Belgian Congo in addition to local clones. Replicated yield, palatability and mosaic-resistance trials are planned.

A simple replicated manurial trial (maize: blood and bone v. control) did not yield significant results. A simple non-replicated trial of two proprietary root-promoting preparations indicated the advantage of using such preparations in the farm's nursery for woody ornamentals.

An oxy-acetylene welding plant was added to the farm workshop. The herd of cattle did well, yielding a total of 36,126 pints of milk from an average of thirty-seven cows.

The farm again co-operated closely with the Indian Agricultural School and farm staff gave much time to practical demonstrations and the supervision of pupils' practical work.

MWANHALA AGRICULTURAL STATION (WESTERN PROVINCE)

This Station was on a care and maintenance basis during the greater part of the year, apart from one observation trial of Hibiscus varieties. A programme of agronomic trials and pasture grass and pasture management trials, and a trial of control measure for maize stalk-borer, has now been drawn up.

SOIL CONSERVATION

The report of the Chief Soil Conservation Officer is printed in Section III of this Report together with an annexure dealing with progress in the Southern Highlands Province. Elsewhere, in Section II, will be found a note on Land Usage Schemes. These are concerned with rehabilitation of eroded land and the reduction and re-settlement of population where over-cultivation and over-grazing make changes in husbandry and soil conservation necessary. The achievements of the team of officers in the Uluguru Mountains where a substantial proportion of cultivators have turned at least a part of their land into bench terraces are worthy of note. Mention must also be made of the continuance of the construction of contour banks in the Central Province. Some 535 miles of this type of protection were added to that already existing, the work being carried out by the people themselves under guidance from technical staff.

The Soil Conservation Section and the Department suffered a serious loss through the death of a most capable and well loved officer Mr. D. Thornton, Chief Soil Conservation Officer. This occurred at a time of severe shortage among the senior ranks and before the establishment in the section had been brought up to strength. It was inevitable in the circumstances that the pace of development which was then mounting rapidly should have received a temporary set back. By the end of the year, however, the staff position had been restored and in fact the service had been extended into the Southern Highlands Province and the Central Province by the posting of Agricultural Officers (Soil Conservation) to those areas.

During the year the Soil Conservation Section ceased to be a Colonial Development and Welfare Scheme and its expenditure was carried by Territorial funds. The section's mechanical equipment included thirteen Allis Chalmers H.D.5 crawlers and seven medium

powered wheeled tractors together with a full range of implements. These included twenty-eight terracers, four of them being made available for loan to individual farmers in the Southern Highlands for use with their own tractors. More than 250 miles of terraces and twelve miles of diversion ditches, dams of a total capacity of eight million gallons and other works were constructed for farmers. The demand for such protective treatment remains enormous and includes an encouraging interest among the tobacco farmers of the Iringa District.

Advice was given on the soil conservation problems of both Africans and non-natives, both direct to farmers and to officers responsible for land usage schemes and district campaigns. Eighteen Departmental and Administrative officers attempted courses at the Section's Tengeru Station, where demonstration and trial plots are maintained.

FISHERIES OF LAKES AND RIVERS

The Department's new 45-ft. motor vessel *Sangala* was commissioned on Lake Tanganyika on April 22nd and was fully engaged in a programme of fishing experiments.

The production of dried dagaa from Lake Tanganyika was around 1,500 tons, valued at approximately £150,000. There were signs of a fall in prices towards the end of the year, but it was a prosperous one for the fisheries. The Fisheries Officer tested various flares and lamps in a search for a substitute for the wood flares now used by the dagaa fishermen, and found acetylene flares the most promising. After testing a number of samples he made arrangements for new and better dagaa nets and cotton seine twines to be on sale in Kigoma.

On Lake Tanganyika experimental fishing has been with trammel and gill nets of various mesh sizes, and to a smaller extent by trolling, trapping, and in-shore trawling. In course of these operations two rich and largely untouched fishing grounds were discovered.

In the Malagarasi Swamp the heavy rains of late 1951 and early 1952 caused much flooding and temporary interference with fishing, but later heavy catches were made and smoked fish exports (normally totalling some 200 tons annually from the Nguruka-Usinge area) were resumed. The European fishmarketing company at Katara has no refrigeration as yet but supplied Kigoma and Tabora with limited amounts of fresh-caught *Tilapia*. Experimental gill-netting and fyke netting resulted in heavy catches and the introduction of two-inch gill-nets and of fyke nets to the native fisheries is contemplated.

The Lake Rukwa fisheries, which had been closed since 1949 owing to the effects of the 1948/49 drought were re-opened on February 1st. They operate under the aegis of the Lake Rukwa Fisheries Board. One European is licensed to fish, and he is also required to purchase,

process and market the catch of the native fishermen. The licensee handled some 320 tons of fresh fish. With an assured market at good prices the native fisheries made most encouraging progress. The licensee concentrated on processing and marketing native catches as labour was insufficient for him to do much fishing himself. The bulk of the fish was hot-smoked and sold to employers of labour. Both as regards numbers and size fish stocks show a very satisfactory recovery from the effects of the 1948/49 drought.

The annual report of the Fisheries Officer (Inland Fisheries) is printed in Section III of this Report.

MARINE FISHERIES

Pending the provision of a vessel which would be suitable for investigating the prospects for commercial fishing it was decided that a survey of the native fishing industry should be made, and a suitable small vessel for this work was sought. Shortly afterwards it was decided to buy locally and extensively re-fit for fishing a somewhat larger vessel, and that the more immediate object of the Unit should be practical investigation and production.

Extensive experimental fishing will be possible only when this vessel (the *Patoni*) is ready but a certain amount has been carried out in a limited area with traps, lines and nets. The Master Fisherman, appointed during the year, has been making gear and teaching his future crew.

Tanga, Pangani, Bagamoyo and fishing villages near Dar es Salaam were visited by the Marine Fisheries Officer who together with the Master Fisherman also spent some time on Lake Tanganyika testing fishing gear which may later be used at sea.

Plans were drawn up for re-fitting *Patoni*. The work started in November and has progressed well. Tenders for refrigeration equipment were considered. Obtaining all the necessary machinery will involve some delay.

Dr. C. F. Hickling, Fisheries Adviser to the Colonial Office; Mr. Taylor, Fisheries Officer, Khartoum; and the South African ichthyologist Prof. J. L. B. Smith visited Tanganyika.

The annual report of the Fisheries Officer (Marine) is printed in Section III of this Report.

FISH FARMING

The Fisheries Officer (Fish Farming) was on leave during the first half of the year, the fish farming station at Korogwe remained on a care and maintenance basis.

Tilapia melanopleura, imported from the Belgian Congo in 1951, bred freely at Korogwe and it is now thought this species may be the most suitable for African managed fish-ponds, it being, in its adult stage, a feeder on grass and leaves rather than on plankton. The culture of plankton is a technique difficult to communicate to the African.

Eight African Fishery Instructors employed by Native Authorities received a course of training at Korogwe. The Fisheries Officer visited seven Provinces during the second half of the year, found some progress in fish-farming projects, and inspected the breeding ponds (in being or under construction in five Provinces). These will de-centralize fry production. The ponds at Moshi prison are now in regular production of both fish for prisoners' rations and fry for distribution.

The growing of rice in association with fish was re-started at the Korogwe Station, using long-term varieties of rice from Malaya and two species of *Tilapia*.

Although yields of fish from the majority of ponds in the Territory have been below those obtained at the Korogwe Station and this has caused some disappointment, it is thought that techniques to suit the varying local conditions can be evolved, and that improved yields will eventually be obtained in the majority of cases. A change to another species, the introduction of predatory fish to reduce excess populations of fry, direct feeding, fertilization to promote plankton growth, the growing of crops in drained ponds, liming, altered water depth, and a number of other possibilities, have been explored in few instances as yet. Trials of the more promising techniques are proceeding.

A second Fisheries Officer (Fish Farming) was appointed, and after a period at Korogwe was engaged in advisory and investigational work in the Southern Province.

BEESWAX AND HONEY

The annual report of the Beeswax Officer is printed in Section III of this Report. He states that the adulteration of beeswax has almost entirely ceased, but that much dirty beeswax is still being offered as a result of inadequate care in cleaning. Beekeeping instructors have continued to press the improvement of the standard of preparation of wax, and have encouraged the preservation of the colonies and of hive-making.

The Beekeeping Station at Tabora was nearly completed during the year and the Beeswax Officer was able to commence the study of pollens and the examination of beeswax samples for the detection of adulterants and impurities.

An Assistant Beeswax Officer was appointed during the year and was posted to the Southern Province. In addition to seven fourteen-day courses for beekeeping instructors a one week's course, open to the public, on frame-hive beekeeping was held.

GRAIN STORAGE

The Department's Entomologist at Morogoro paid considerable attention to problems of grain storage during the year. Observations on sealed-pit storage trials and moisture losses in bagged grain appear in his annual report, which is printed in Section III of this Report.

LAND USAGE SCHEMES

The Department remains very closely concerned with a number of undertakings, large and small, which are designed to result in better land usage in the broadest sense of that expression.

A number of minor schemes are referred to in the Provincial Summaries which appear elsewhere in this Section, but special reference must be made to work in Sukumaland (Lake Province), the Western Usambaras (Tanga Province), the Mbulu District (Northern Province), and the Uluguru hills (Eastern Province). These schemes are reported on in detail by their Executive Officers to the Provincial Commissioners concerned, but since a number of officers of the Department of Agriculture are attached to them and agricultural activities are a dominant feature it is not out of place to refer here to their progress and to the problems encountered. In addition to those Departmental officers who are formally attached to these schemes many of the staff are members of committees at district or provincial level which decide policy, and also serve in an advisory capacity and undertake experimental work with funds provided by the schemes.

The aims and achievements of the Sukumaland Development Organization cannot be described adequately in a summary of this nature but the following points from the Provincial Commissioner's annual report on its activities give some indication of those of an agricultural nature.

Advisory Land Councils met in each of the five districts and started on the work of closing parishes to further immigration where considered necessary in order to limit pressure on the land. Surveys to determine areas of utilizable and non-utilizable land were carried out. Ploughing rules were formulated and brought into force. Contour ridging, tie-ridging, and anti-erosion grass strips were the subject of extension work in areas endangered by erosion. Rice nursery beds in Kwimba District and elsewhere were maintained and were a useful source of planting material. Four new fish ponds were completed. The Organization's earth moving equipment, consisting of two small

crawler tractors, one wheeled tractor, scrapers, rippers and rollers was at work on dam building. The report also refers to the Organization's activities in the fields of animal husbandry, forestry, mapping, communications, social services, and community development.

The District Officer in charge of the Usambara Scheme reported in detail on all its aspects, and the following notes are compiled from his report and from the report of the Regional Assistant Director of Agriculture, Northern and Tanga Provinces.

The aims of the Scheme include the checking of soil erosion in the Western Usambara mountains, the maintenance or improvement of soil fertility, increased production of food and cash crops, and the facilitation of settlement in underpopulated plains areas adjoining the, mainly over-populated, mountains. The use of the tied cultivation ridge on contour, the conservation of organic material, the control of grazing, and the use of stall-feeding, the closure of over-steep slopes to arable cultivation combined with a re-afforestation programme, the irrigation of plains land from the Luengera and other streams, and the provision of a tractor ploughing service in the plains are among the means which have been adopted by the Scheme to achieve its aims.

The District Officer in charge reports that the year was characterized by further gradual implementation of the Scheme as it applies to the hill sub-chiefdoms and by considerable clarification of the aims of and the methods to be used in, the programme for the plains. Thirty-three per cent of the tax-paying population of the hills was engaged at the end of the year in the task of tie-ridging a proportion of their land and there was a ready acceptance of the prohibition of grazing cattle on arable fields. The progressive closure of over-steep land was, however, highly unpopular and it is plain that further work upon influencing "public opinion" will be very necessary if rapid progress is to be achieved in this direction. The ploughing service in the plains proved popular and there was a spontaneous demand which exceeded the capacity and present intentions of the Scheme. Maize harvests were poor owing to weather conditions, but the officer in charge states that a fine sorghum crop was harvested.

The Superintendent of Agriculture who is attached to the Scheme, together with the District Agricultural Officer, undertook trials of rice, cotton, maize, cassava, sweet potatoes, millets, sorghums, groundnuts and a number of other crops on thirty-six acres of experimental plots at six sites on the east and west of the mountain block, and undertook the survey and lay-out of irrigation and drainage schemes. The Superintendent of Agriculture was also largely responsible for ensuring that the aims of the Scheme in the hills were carried out in the most effective manner.

The following summary of the annual report of the Executive Officer of the Uluguru Land Usage Scheme illustrates the progress made and the difficulties which have been encountered in achieving aims very similar to those of the Usambara Scheme.

Considerable staff changes during the year hampered the continuity essential to a scheme of this nature. Nevertheless, during the year steady progress was made in all the pilot areas and the principles and objects of the scheme appear to be welcomed, though the labour involved in executing the required conservation measures often results in a poorer achievement than anticipated. In the areas first dealt with the Waluguru pronounced themselves more than satisfied with their labours, but in the newer areas, the people remain unconvinced until the results become apparent. A major stumbling block is the traditional burning of bush, as well as crop residues. In a prolonged dry season, such as that experienced in 1952, extensive areas of the mountain sides went up in sheets of flame and it seems probable that greater attention will have to be given to controlled early burning rather than attempting the complete prohibition of burning. Emphasis has been placed on trash bunding and contour banking on the gentler slopes, in addition to bench and step terracing on the steeper slopes where land is suitable for cultivation.

It is clear that greater attention must also be paid towards mass education and propaganda in order to overcome the existing apathy. With this end in view a special course for all European staff and certain selected African staff of the Native Authorities, Education Department and, it is hoped, the Missions, will be undertaken early in the new year. The course is designed to include instruction in Kiswahili, soil conservation and modern techniques in propaganda and education. The object will be to establish a nucleus of those most closely concerned with the development of the Uluguru Land Usage Scheme and thus to increase the momentum of the scheme so that eventually it is maintained largely by its own volition, with only the minimum of supervision and instruction.

The rate of bench terrace construction increased considerably during the year despite the hardening of the ground during the long dry spell.

<i>Field Terraces</i>		<i>Matombo</i>		<i>Tangeni</i>		<i>Mgeta</i>		<i>Mkuyuni</i>		<i>Total</i>
1951	...	519	...	397	...	—	...	—	...	916
1952	...	2,093	...	628	...	2,688	...	152	...	5,561

The above figures do not include the steadily increasing number of cultivators who annually construct small weedrow ridges across the slopes.

Included in the Matombo area is the new area of Bwakira Juu where the work was carried out under the supervision of four Departmental Instructors, backed by a vigorous sub-chief and his headmen. In one

village almost every taxpayer had completed a quarter of an acre of terracing within two months. Doubt has been expressed in some quarters as to the continuing fertility of terraced land. Results to date are indecisive at Matombo, but definitely encouraging in the Tangeni area where the locals have expressed satisfaction at the increased yields obtained. Terracing has not been advocated as a sovereign remedy for all the evils of erosion and the Africans have been informed that exhausted soil cannot produce good crops, even if terraced. In general, terracing has proved itself as a soil and water conservation measure though not yet from the angle of productivity of the soil. The method of terrace construction may have to be modified and more work directed towards raising the level of fertility of these terraces by such means as surface mulching, introducing soil improving crops and possibly the use of fertilizers.

Trash bunding was introduced in the Matombo area when the Field Officer returned from a visit to Mbulu in September. During the next two months, 622 fields were trash banded or contour banded.

Progress was also recorded with afforestation measures. All nurseries have been multiplied and the acreages planted during the long rains showed a very creditable increase. Unfortunately, the early cessation of the long rains followed by serious grass fires destroyed some hundreds of acres of tree seedlings.

Acreages planted were.—

<i>Year</i>			<i>Matombo</i>		<i>Tangeni</i>		<i>Mgeta</i>		<i>Total</i>
1951	...	...	—	...	—	...	—	...	768
1952	...	...	191	...	559	...	650	...	1,400

Cloves obtained from Zanzibar are doing well and some 300 seedlings are ready for planting out during the 1953 long rains. Rubber failed again as did mangosteen, rambutans, durian and nutmeg, attempts to cultivate which are being discontinued. The expansion of citrus has been stopped owing to the uncertain market. Wattle, cypress, cassia and eucalyptus continue to be the main-stays of the planting programme. Mahogany, coconuts and kapok have also been tried at Matombo; 120,000 coffee seedlings in fifteen nurseries are ready for distribution compared with 10,000 distributed in 1951. The demand for coffee seedlings far exceeds the supply.

An experimental planting of an eroded valley with tree seedlings on a clan ownership basis in the Mgeta area will be watched for sociological and political reactions. There is a marked aversion for providing land for Native Treasury forests and individual tree planting and ownership raises future problems on intermarriage since the clans are exogamous.

A fish pond was constructed and stocked with Tilapia towards the end of the year and a breeding pond at Mgeta is ready for stocking.

Instruction by visual aids has continued but will have to be expanded. The film made by the Film Research Officer on terrace construction has told its story well to numerous audiences. Films appear to have a greater propaganda value than stills, probably because stills depend to a greater extent on the personality and teaching ability of the demonstrator. It is felt, however, that the latter would be of greater value if small inexpensive really reliable light-weight projectors operated from dry batteries could be obtained for use by African Instructors for showing in village schools and native huts.

The Co-operative Society, established in 1951, has prospered and now numbers 2,300 members. Six hundred and twenty-seven tons of vegetables valued at £14,057 were marketed by the Society through its appointed agent. Embryo co-operatives at Tchenzema and Matombo have been discussed. The subsidiary effects of co-operative marketing of vegetables have not yet been fully felt, namely the reduction of prices in Dar es Salaam and Morogoro, though in the latter case this has been achieved to some extent by a basket trade set up by the Society's agent.

River gauges are now operating at various points on the Ngerengere River at Kohonda Bridge, Kingolwira, Kizuka and beyond; on the Ruvu River at Matombo, Tununguo and Kidunda; and on the Mgeta River at Kisaki.

In conclusion it can be said that good progress has been made during the year in bench terracing and tree planting, but there is no cause for complacency when one observes the vast area to be covered. The incidence of bush fires in the mountains is a constant source of trouble, encouraging erosion, destroying the fertility of the land and large tracts of newly planted trees. It is essential that some greater internal impetus be achieved so that the labours of Field Officers and their staff may not be exhausted in overcoming inertia, but may be more widely and beneficially used in guiding and helping a people who really desire to progress in the right direction. By increased emphasis on demonstration, visual aids and mass literacy, it is hoped to provide that awakening of the public conscience so necessary for the future interests of this densely populated and economically important area.

The Scheme for the Development of Mbulu District is reported on in detail by the Provincial Commissioner concerned, and points from his report and from that of the Regional Assistant Director of Agriculture, Northern and Tanga Provinces, are included in the following paragraphs.

At the end of the year the five years of progress financed by the Colonial Development and Welfare Fund to the extent of £90,900 came to an end, but more remains to be done than has been accomplished in the past. De-stocking, the clearing of tsetse bush, water development,

resettlement, the trash-bunding of erodible slopes, the improvement of grazing areas, and afforestation are included among the means which have been used and will continue to be used for the general betterment of the population.

Many of the experiments listed in the Northern Province "Provincial Summary", printed elsewhere in Section II of this report, and carried out by the Department of Agriculture, had a direct bearing on the problems of the Mbulu District, while a further series of observations and other trials were expressly designed to obtain further knowledge about the problems of erosion in that district. Many of this latter series were laid down on the Scheme's Central Development Farm and among those undertaken were the following:—

A trial to determine the optimum widths of alternate grass and arable when strip-cropping on slopes of six to twelve degrees.

A trial to determine soil movement on trash-bunded land.

A method-of-cultivation trial comparing flat cultivation, tied ridges, made bench terraces, open ridges, and contour banks.

A distance-of-planting trial, using maize.

A trial of trash bunds as a means of reclaiming gullied land.

Trials of the carrying capacity of Rhodes grass leys.

Observations of various systems of under-sowing oats and beans.

Observation plots of a wide range of crop, fodder, and soil-holding plants.

All these trials and observations assisted the officers concerned in their search for solutions to the problems of the district.

AGRICULTURAL EDUCATION

Much of the time of every officer of the Department working in the field, and others besides, is spent in furthering agricultural education, either directly or indirectly, and the activities of the Department's experimental stations and farms are of considerable educational value. Formal and informal courses during 1952 are described in the following paragraphs.

The Department of Education made arrangements with the Department of Agriculture's Ukiriguru Training Centre which permitted a larger number of Department of Education teachers to undergo training at the Centre. Forty-five Department of Agriculture African instructors and twelve teachers completed the two year course, fifty-two instructors and eighteen teachers completed their first year of training and fifty instructors and thirty teachers commenced their training. The increased number of teacher-trainees inevitably results in a restriction in the number of instructor-trainees who can be enrolled, in spite of the addition to the staff of two Department of Education

teachers. The teacher-trainees have been found, however, to exert something of a leavening influence on the student body by reason of their generally higher standard of general education and intelligence, and their presence at the Centre is therefore very welcome. A large proportion of newly enrolled instructor-trainees and teacher-trainees are of Standard VIII (or higher) in their general education. Some aspects of field work were hampered by the exceptionally heavy rain during the year, and there was flood damage to classrooms and other buildings—but the officer in charge reports that these conditions were turned to good account by intensifying practical work on drainage and terracing by ox-drawn dam scoops. Certificates awarded to those completing the two-year course in 1952 were as follows:—

CERTIFICATES

		CERTIFICATES					
		First Class		Second Class		Third Class	
<i>Higher Course:</i>							
Instructors	...	...	5	...	5	...	—
Teachers...	...	...	5	...	7	...	—
<i>Lower Course:</i>							
Instructors	...	...	8	...	18	...	9
Totals		...	18	...	30	...	9

The Indian School of Agriculture at Morogoro, which was started in 1950 in order that Indians with a basis for agriculture might receive a "Farm Institute" type of training which would fit them for practical farm work and management, completed the first (eighteen months) course in April 1952. Of the thirty students who had originally enrolled for this course only nineteen remained for the final term and examinations. Of these, two students elected to return to the school for a further six months, one of them staying the full period. The School's second course (planned as a two year one) began in January and although there were vacancies for fifteen students only ten started the course and two of these have already left. Of the eight students now attending the School three are from Tabora, one from Mwanza, one from Dar es Salaam, one from Iringa and two from Kenya (Mombasa). A third course has been advertised in the press but the applications are few and it appears that the demand among Indians for agricultural education of the type offered by the School is not great. The School is now well equipped, and a full programme of theoretical and practical instruction was undertaken during the year. A Field Officer (Agriculture) assisted the Principal and the Asian Assistant Master.

The Department's Chief Soil Conservation Officer conducted an eight weeks' course in conservation methods which was attended by eight Field Officers (Agriculture), a ten-day course attended by ten Administrative Officers, an eight weeks' course for eleven African

Agricultural Instructors working on the Uluguru Land Usage Scheme and a four weeks' course for four African Agricultural Instructors from Kasulu. There were many visitors to the Soil Conservation Centre.

A number of members of the Department's staff with specialized knowledge conducted courses in such subjects as fish-farming, beeswax and honey production, land usage, and sundry aspects of agriculture. African chiefs, elders and farmers attended a number of these courses, others being for the benefit of Departmental and Native Authority instructors.

The Department maintained close relations with the Kilimanjaro Native Coffee Growers' Union's Coffee School, the instruction at which is based on the recommendations of the Department.

An innovation during the year was the holding (by the Beeswax Officer, at Tabora) of a week's course on frame-hive beekeeping which was open to the general public. The work of the Agricultural Officer (Experiments) among the pyrethrum growers of the Southern Highlands in assisting them to carry out their own field experimentation was an interesting and valuable example of the varied means by which the Department promotes agricultural education. Co-operation between the Department and the teachers in government and mission schools was maintained by personal visits from Departmental field staff. There were further issues of instructional and advisory leaflets in both Swahili and English.

The Annual Report on the Indian School of Agriculture is printed in Section III of this Report.

COUNCILS, BOARDS, AND COMMITTEES

The present holder of the post of Director of Agriculture is a Nominated Official Member of Legislative Council, Chairman of the Coffee Board, the Cotton Board, and the Seeds Board, and a member of the Livestock Board, Natural Resources Board, Tea Board, and Tanganyika Sisal Board. He is also a member of the Management Committee of the Sisal Research Station, and is a member of three inter-territorial bodies, the East African Advisory Council on Agriculture, Animal Industry and Forestry, the Central Tea Committee, and the East African Marine Fisheries Research Advisory Committee. He attends meetings of the Pyrethrum and Tobacco Boards and is a member of the Board of the Southern Highlands Non-Native Tobacco Growers' Union Limited. The present holder of the post of Deputy Director of Agriculture is Chairman of the Milling Board.

The Regional Assistant Director of Agriculture, Arusha, is a member of the Coffee Board and the Seeds Board. The Senior Research Officer, Lyamungu, is a member of the Coffee Board. The

Provincial Agricultural Officer, Southern Highlands, is a member of the Non-Native Tobacco Board.

Many officers of the Department are chairmen, members, or executive officers of Provincial and District Boards and Committees concerned with crop production, marketing, land usage, water, etc.

LINT AND SEED MARKETING BOARD

The Lint Marketing Ordinance came into effect on 1st April, 1952, except insofar as the provisions of that Ordinance relate to cotton seed. These were however subsequently brought into effect on 11th November, 1952.

The Board is constituted of—

- (a) The Member for Agriculture and Natural Resources (*Chairman*).
- (b) The Provincial Commissioner, Eastern Province.
- (c) The Provincial Commissioner, Lake Province.
- (d) The Director of Agriculture.
- (e) Not less than five other members to be appointed by the Governor of whom one shall be a native appointed to represent the interests of native producers in the Lake Province and one shall be appointed to represent the interests of native producers in the Eastern Province.

The Board is a corporate body having perpetual succession. The main functions of the Board are—

- (a) to purchase from ginnerers all cotton lint and cotton seed produced by them at prices which are arrived at in specified ways, and
- (b) the disposal of the lint and cotton seed either by sales within the territory or without.

In addition certain sums of money allocated to it by resolution of the Legislative Council are vested in the Board and the Board has the responsibility of managing these funds for the benefit of the cotton grower. Two funds are to be maintained by the Board:

- (1) the Cotton Price Assistance Fund, which may be used only for the maintenance of prices to be paid for cotton lint;
- (2) the other, the Ordinary Fund of the Board, constitutes its working capital.

The Ordinance also establishes as corporate bodies with perpetual succession two provincial Cotton Committees for the Lake and Eastern Provinces respectively. These bodies are constituted of

- (a) the Provincial Commissioner of the province concerned (*Chairman*)

(b) the corresponding Regional Assistant Director of Agriculture and,

(c) seven members to be appointed by the Governor of whom not less than two shall be native members.

The functions of the Provincial Cotton Committees are to advise the Board on the expenditure of money for the benefit of the cotton industry within their respective provinces; and to carry into effect any projects for which the Board supplies them with money.

LEGISLATION

The following summarizes the principal legislation, related to agriculture, enacted during 1952:—

Tobacco.—The Tobacco (Non-Native) Ordinance replaced the Tobacco (Non-Native Industry) Ordinance (as amended), the latter being repealed. The new Ordinance extended the definition of tobacco to all types of smoking tobacco, provided for the establishment of licensing authorities with powers to grant licences to grow tobacco and limit the acreage grown by any farmer, provided for conditions in such licences stipulating the planting of trees for firewood, provided for the licensing of commercial grading sheds, and authorized provisions in Rules under the Ordinance for penalties in respect of specified offences. The constitution of the Non-Native Tobacco Board was changed. The purpose of the Ordinance was to ensure the maintenance of good standards in tobacco produced and sold.

A Southern Highlands Tobacco Licensing Authority was established by Government Notice, as was the Southern Highlands Non-Native Tobacco Board, under the new Ordinance. Forms of application for licences, and for licences, to plant tobacco and operate commercial grading sheds were also set out in a Government Notice.

A levy of six cents per pound on tobacco produced in the Southern Highlands Province in 1953 was laid down by Government Notice.

Other legislation referring to tobacco is summarized under the heading "Plant Protection".

Cotton.—The Lint and Seed Marketing Ordinance replaced by permanent legislation the provisions of Defence Regulations governing the marketing and disposal of cotton lint and cotton seed. The Ordinance is so worded that it may be brought into force as to different areas of the Territory or as to different provisions of the Ordinance on different dates and so far as the Ordinance relates to cotton seed it does not come into force unless an Order to that effect is made by the Governor in Council, who may also suspend the operation of any provisions of the Ordinance at any time. The Ordinance provides for the establishment, constitution and function of a Lint and

Seed Marketing Board of eight members, the chairman to be the Member for Agriculture and Natural Resources and membership to include the Provincial Commissioners of the Eastern and Lake Provinces and the Director of Agriculture. Provision is made for cotton on delivery to a ginner to become the property of the ginner and afterwards to become the property of the Board as soon as it is ginned into cotton lint and cotton seed. This legislation while confining the ginner's functions to those of buying, collecting, ginning and delivering cotton in bales provides for so organizing the sale of the crop that bulk contrasts can be entered into which would favour stability of producer prices and the possibility of setting aside part of the proceeds in a Price Assistance Fund. It is specified in the Ordinance that the prices to the producer and to the ginner are to be fixed by the Director of Agriculture after specified consultations. Provision is made for the appointment of cotton lint and cotton seed supervisors and the licensing of persons to buy cotton lint and cotton seed from the Board. The disposal of lint or seed otherwise than in accordance with the provisions of the Ordinance is prohibited. The Ordinance provides for the establishment of Provincial Cotton Committees to advise the Board as to the expenditure of its funds in the areas covered by them and to carry out schemes authorized and financed by the Board.

Government Notices under the Ordinance specified licence fees and brought the Ordinance into force so far as it relates both to lint and to cotton seed.

The Export Tax (Cotton) Order was extended by an Amending Order to have effect after the original expiry date in respect only of lint derived from the 1951 harvest.

Government Notices specified cotton buying points and dates, and dates for uprooting and burning cotton plants and cotton residues.

Tea.—The Tea (Amendment) Ordinance made provision for the nomination of proxies by members of the Tea Board, such proxies to be approved by the Governor, and authorized the Tea Board to make contributions to the Tanganyika Tea Growers' Association from the proceeds of any cesses or from other moneys accruing to the Board.

Coffee.—An Ordinance to make provision for the application of certain moneys accrued from the sale of coffee by the Bukoba Native Coffee Board established under the African Agricultural Products (Control and Marketing) Ordinance and for other matters incidental thereto enabled the Bukoba Native Coffee Board to apply these moneys to such purposes as the Governor in Council shall direct.

Government Notices under the African Agricultural Products (Control and Marketing) Ordinance of 1949 imposed a levy of ten cents per pound on coffee in parchment and hulled or dried cherry grown by

Africans in the Moshi District and enjoined African coffee growers in that District to comply with directions of the Moshi Native Coffee Board as to the sale of coffee in the interests of the industry.

The Defence (Sale of Coffee) Order of 1951 was revoked.

A Government Notice made certain amendments to the Produce Export (Bukoba Coffee) Rules of 1951 in the interests of the industry.

A Government Notice under the African Agricultural Products (Control and Marketing) Ordinance of 1949 appointed a Board to be known as the Arusha Native Coffee Board for the controlling of cultivation production and marketing of coffee grown and produced by Africans in the Arusha District of the Northern Province, and a Government Notice under the Ordinance enjoined such growers to comply with the directions of the Board as to the sale of coffee. This brought such coffee under similar control to that exercised over the produce of the Moshi District.

Coconut and Copra.—The export tax on copra, coconut oil and cake was removed by Government Notice under the Export Tax (Amendment) Ordinance, 1947-1949.

Wheat.—The sale of wheat grown by non-natives in the Northern Province except to the Kenya Farmers' Association (Co-operative) Limited was prohibited by Government Notice under the Sale of Wheat Ordinance of 1940 (as amended), that organization acting as agents for the Department of Grain Storage.

Various African Agricultural Products.—An Ordinance amending the African Agricultural Products (Control and Marketing) Ordinance empowered Boards established thereunder to invest funds under their control.

The African Produce (Cess) Ordinance enabled the Member for Local Government subject to certain provisions of the Ordinance and after consultation with and at the request of a Native Authority to impose by published Order cesses to be raised levied collected and paid in respect of any African produce bought and sold within or exported from the area of jurisdiction of the Native Authority concerned. Such cesses are to augment the general revenue of such Native Authorities.

By Government Notice under the African Agricultural Products (Control and Marketing) Ordinance of 1949 the production and cultivation by Africans and the marketing of paddy in the Rufiji District of the Eastern Province was controlled by a Board (the Rufiji Paddy Board) appointed for the purposes in the interests of the industry.

A Government Notice appointed a Board under the African Agricultural Products (Control and Marketing) Ordinance of 1949 to be known as the Muheza Area Oranges Board for the purpose of controlling the production cultivation and marketing of oranges grown

and produced by Africans in the Muheza area of the Tanga Province in the interests of the industry.

Fisheries.—By Government Notices under the Fisheries Ordinance it was laid down that certain species of fish captured in Lake Rukwa should be sold through such agency as the Lake Rukwa Fisheries Board may direct, and that a levy of one cent per pound weight be collected by the Board in respect of fish of the species *Tilapia rukwaensis* sold in accordance with the Board's directions. These Orders were made so that funds should be available for the safeguarding and improvement of fisheries.

Plant Protection.—Government Notices under the Plant Protection Ordinance approved Arusha as a place of entry of imported plants, declared Anthracnose, Mosaic and Halo Blight of beans are diseases for the purpose of the Ordinance, ordered the uprooting and/or burning of tobacco plants residues and refuse in or near tobacco premises in named areas, excluded from the Schedule of the Ordinance maize seed originating from Kenya, Uganda and Zanzibar, prohibited the removal of any part of a banana plant in which the disease "Banana Wilt" is or might be suspected to be present from certain named Districts, and prohibited the import of cotton lint or cotton seed in transit from Northern Rhodesia or the Belgian Congo for export except through the port of Kigoma.

Other legislation in the interests of plant protection is referred to under "Cotton".

PUBLICATIONS

Articles sent to the Editor, East African Agricultural Journal, for publication during the year 1952, were as follows:—

January Issue:

"Pea Blight" by G. B. Wallace and Maud M. Wallace

April Issue:

"Wilt or Panama Disease of Banana" by G. B. Wallace.

July Issue:

"Bole Rot of Sisal" by Maud M. Wallace and E. C. Diekmahns.

October Issue:

"Beekeeping Observations in Tanganyika, 1951/52" by F. G. Smith.

"The Destruction of Rice-eating Birds" by N. R. Fuggles-Couchman.

The following publications were made during the year:—

Departmental Leaflets

No. 22 Tumia Bomba la Moshi.

CONCLUSION

The very numerous interests of the Department of Agriculture bring its officers into contact with a wide circle of private persons, who assist Government with their services, on agricultural and marketing Boards, Production Committees and other organizations dealing with the land and its produce. Members of the Provincial Administration and of the Native Authorities are always in touch with us, and numerous officers of other departments in the Natural Resources group give us their help. Their assistance is gratefully acknowledged; and I would close this report with a mention of that keenness and enthusiasm among all ranks which continues to be a marked characteristic of officers of this Department.

C. E. J. BIGGS,
Director of Agriculture

MONTHLY RAINFALL IN INCHES FOR SEASON 1951/52 AND YEAR 1952
AT PROVINCIAL STATIONS

	EASTERN PROVINCE MOROGORO		CENTRAL PROVINCE DODOMA		WESTERN PROVINCE TABORA		LAKE PROVINCE MWANZA		SOUTHERN HIGHLANDS PROVINCE IIRINGA		NORTHERN PROVINCE ARUSHA		TANGA PROVINCE LUSHOTO		SOUTHERN PROVINCE LINDI	
	Ins.	Average 32 years Ins.	Ins.	Average 13 years Ins.	Ins.	Average 41 years Ins.	Ins.	Average 21 years Ins.	Ins.	Average 21 years Ins.	Ins.	Average 28 years Ins.	Ins.	Average 37 years Ins.	Ins.	Average 12 years Ins.
October 1951	1.09	0.90	0.01	0.23	1.08	0.58	1.71	1.93	0.13	0.21	3.45	1.29	5.48	1.26	0.57	0.60
November...	5.66	2.06	0.58	1.30	5.82	4.00	6.76	4.61	1.71	1.58	—	4.17	4.97	3.83	3.99	2.08
December	9.31	2.69	—	3.17	9.03	6.68	15.10	5.54	5.23	4.66	—	3.99	7.26	4.31	5.91	5.92
		Average 33 years Ins.		Average 14 years Ins.		Average 42 years Ins.		Average 22 years Ins.		Average 22 years Ins.		Average 29 years Ins.		Average 8 years Ins.		Average 13 years Ins.
January 1952	2.49	3.88	3.00	5.27	5.34	4.99	3.57	3.73	3.76	6.98	1.15	2.31	1.93	3.01	3.24	5.81
February	7.56	3.79	5.26	3.63	4.23	4.97	4.52	4.17	9.15	4.89	3.87	3.34	2.79	2.91	12.46	4.19
March	2.77	7.16	4.15	5.05	6.04	6.75	8.28	6.19	7.36	7.06	6.62	7.14	4.97	5.73	5.23	6.43
April	6.97	8.18	3.28	1.75	4.52	5.41	8.36	5.58	4.17	3.43	12.33	14.84	5.72	9.03	12.53	7.46
May	3.86	3.84	1.05	0.13	3.46	1.09	6.02	3.61	0.83	0.53	5.02	8.29	7.52	7.29	3.75	1.31
June	0.68	1.13	—	0.07	0.00	0.11	0.00	0.77	0.04	0.07	0.62	1.33	1.75	2.13	0.12	0.41
July	0.35	0.55	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.34	0.56	0.07	1.41	0.04	0.34
August	0.45	0.37	0.00	0.00	0.00	0.04	0.14	0.81	0.03	0.02	0.16	0.77	0.20	0.86	0.55	0.21
September	1.20	0.64	0.00	0.00	0.27	0.28	3.04	1.77	0.00	0.11	0.67	0.81	1.66	0.66	0.39	0.51
Total for season	42.39	35.19	17.33	20.60	39.79	34.90	57.70	39.29	32.41	29.54	34.23	48.74	44.33	42.46	48.78	35.27
October	1.83	0.91	—	0.21	0.98	0.59	1.14	1.92	0.36	0.21	0.52	1.40	1.20	1.37	1.99	0.66
November...	1.02	2.17	0.15	1.25	2.37	4.04	1.61	4.69	0.29	1.58	5.15	4.42	3.23	3.86	0.77	2.22
December	0.29	2.88	0.05	3.32	2.55	6.74	0.15	5.91	0.69	4.69	2.26	4.08	1.88	4.38	2.99	5.91
Total for the year 1952	29.47	35.50	16.94	20.68	29.76	35.01	37.03	39.73	26.68	29.57	38.71	49.29	32.92	42.67	44.06	35.46

All figures quoted in the above table are abstracted from Summaries of Rainfall records for the year 1951 and 1952 issued by the East African Meteorological Department.

EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1947 TO 1952

The following table shows the principal exports of the Territory since 1947 with the values of those for 1952

	Maximum output for export prior to 1952	1947		1948		1949		1950		1951		1952		Total value for 1952
		Amount	Tons	Amount	Tons	Amount	Tons	Amount	Tons	Amount	Tons	Amount	Tons	
Sisal ...	1951	142,106	95,856	117,092	132,541	118,909	142,106	156,167	21,708,053					
Cotton Lint ...	1941	13,106	7,045	9,893	10,800	7,006	8,315	11,105	4,679,162					
Coffee ...	1935	18,588	13,858	11,268	12,040	14,991	16,565	18,619	5,540,442					
Hides and Skins ...	1950	5,471	4,609	3,310	4,059	5,471	4,023	3,894	1,051,395					
Barley ...	{	No figures available.												
Beans and Pulses ...														
Beans, Soya ...														
Beeswax ...	1948	905	410	905	525	315	673	599	233,469					
Cashewnuts ...														
Castor Seed ...		No figures available				6,532	8,165	11,506	531,988					
Cassava ...						3,302	7,570	12,345	881,155					
Copra ...	1928	9,318	40	48	3,585	886	142	15,177	265,082					
Fats ...	1944	1,247	71	1,689	6	20	123	79	277,040					
Gums ...	1944	2,567	1,554	1,490	878	2,428	1,788	575	6,776					
Ghee ...	1942	1,385	44	272	54	27	4	53	50,450					
Groundnuts ...	1936	22,786	3,534	3,129	838	75	3,499	9,435	14,566					
Honey ...	1948	No figures available				1			634,364					
Kapok ...						653	381	468	103,882					
Maize ...	1948	3,070	1,875	3,070	105	7	559	8,353	240,123					
Millet and Sorghums ...	1928	7,732	4,741	1,914	74	1	4,137	2,767	18,560					
Mangrove Bark ...	1942	7,291	3,408		1,446	857	828	967	19,247					
Onions ...	1948	2,418	1,754	2,418	275	296	446	187	8,925					
Palm Kernels ...		No figures available				323	334	374	17,396					
Papain ...	1948	130	109	130	119	19	18	43	168,079					
Pyrethrum ...	1945	697	241	170	141	175	149	156	41,273					
Rice ...	1938	17,965	2,615	6,450	1,547	30	151	343	14,906					
Rubber ...	1944	1,314	49	54	18	8	20	2	551					
Sesameseed ...	1938	5,241	493	928	6				27,909					
Sugar ...	1941	5,454	838	568	5	2	5	10	572					
Sunflowerseed ...	1951	9,512		2,298	5,228	8,911	9,512	17,708	619,237					
Tea ...	1951	821	446	462	427	484	821	1,011	302,787					
Tobacco ...	1948	1,421	667	1,421	1,073	1,130	781	641	135,444					
Vegetable Oils ...														
Wattle Bark ...	1940	2,268	900	1,463	933	1,400	1,318	979	70,327					
Wheat ...		No figures available							25,407					
Essential Oils:	1945	4,511												
(a) Lemon grass oil						(a)	2	2	2,295					
(b) Orange oil		No figures available				(b)	4	(d)	1,528					
(c) Geranium oil						(c)		(e)	375					
(d) Others								(f)	1,662					
Total ...	-	-	145,157	170,442	176,723	184,463	229,429	305,523	38,693,958					

(Fractions of tons omitted):

(a) 1,543 lbs. (b) 75 lbs. (c) 1,529 lbs. (d) 2,160 lbs. (e) 131 lbs. (f) 563 lbs.

LIST OF EUROPEAN STAFF ON THE 31ST DECEMBER, 1952

Director: C. E. J. Biggs, B.Sc. (Lond.), Dip. (Agric.) (Wye), Dar es Salaam.

Deputy Director: J. R. P. Soper, B.A. (Cantab.), Dar es Salaam.

Chief Soil Conservation Officer: L. J. S. Littlejohn, B.Sc. (Glasgow), A.I.C.T.A., Tengeru.

Regional Assistant Directors:

H. P. Smart, B.Sc., A.I.C.T.A., On leave.*

C. J. McGregor, C.D.A., Arusha.*

A. H. Savile, C.D.A., A.I.C.T.A., Morogoro.*

N. V. Rounce, C.D.A., A.I.C.T.A., Mwanza.

Senior Research Officers:

F. R. Sanders, B.A. (Cantab.), Dip. Agric. (Cantab.), Lyamungu.

G. W. Lock, O.B.E., M.D.A., N.D.D., A.I.C.T.A., Ngomeni.

Entomologists:

G. Swaine, B.Sc. (Sheffield), On leave.

R. G. Tapley, B.Sc. (Lond.), On leave.

A. J. Jones, B.Sc. (Zoology) (Cardiff), D.I.C., Lyamungu.

Plant Pathologist:

G. B. Wallace, B.Sc., Ph.D. (Edin.), Lyamungu.*

Botanist:

H. Doggett, B.A. (Cantab.), A.I.C.T.A., Ukinguru.

Agricultural Officers:

C. W. L. Fishlock, B.Sc. (Agric.) (Lond.), On leave.

J. K. Robertson, B.Sc., (Agric.) (Aberd.), A.I.C.T.A., Arusha.

J. T. Purvis, B.Sc. (Agric.), On leave.

E. T. Ward, C.D.A., Mbeya.

H. L. Brett, Lindi.*

T. S. Jervis, Bukoba.*

D. G. Jones, B.A. (Cantab.), Dip. Agric. Sc. (Cantab.), A.I.C.T.A., Lyamungu.

M. Lunan, B.Sc. (St. Andrews), A.I.C.T.A., Iringa.*

J. B. Clegg, B.A. (Oxon), Tabora.*

R. W. Collett, Singida.

F. E. Luscombe, B.Sc. (Agric.) (Reading), A.I.C.T.A., Moshi.

D. H. Drennan, B.Sc. (Dublin), Dip. Agric. (Cantab.), Lushoto.

A. H. B. Childs, F.L.A.S., M.R.A.C., Tanga.*

C. G. Glegg, Dip. Hort. (Wye), Dodoma.*

J. D. Hunter-Smith, B.Sc. (Agric.) (Reading), A.I.C.T.A., Tengeru.

J. S. Gunn, B.Sc. (Agric.) (Edin.), Dip. Agric. (Cantab.), On leave.

W. G. Brookbank, B.Sc. (Agric.) (Reading), Chambezi.

A. Jefferiss, B.Sc. (Hort.) (Reading), N.D.H., Dar es Salaam.

N. E. S. Mutter, B.Sc. (Agric.) (Leeds), Malya.*

C. C. Shapland, B.Sc. (Agric.) (Reading), Dip. Agric. (Cantab.), D.T.A. (Trin.), Mwanhala.

I. Constantinesco, B.Sc. (Agric.) (Reading), On leave.*

H. Sandford, B.A. (Cantab.), Lyamungu.

A. Hamersley, M.B.E., B.Sc. (Agric.) (Reading), Arusha.*

G. K. Reakes-Williams, B.Sc. (Agric.) (Bangor), Dip. Agric. (Cantab.), On leave.

C. G. Birch, B.Sc. (Agric.) (Edin.), On leave.

M. J. W. English, B.A. (Cantab.), On leave.*

A. E. Carlaw, B.Sc. (Soil Cons.) (Witwatersrand), Iringa.*

A. Sykes, B.Sc. (Agric.) (Reading), Malya.*

R. F. Le Duc, B.Sc. (Agric.) (Dunelm), B.Sc. (Pure Science) (Dunelm), Dar es Salaam.

D. P. Allan, B.Sc. (Agric.) (Glasgow), Mbosi.*

K. Johansen, B.Sc. (Agric.) (Edin.), Dodoma.*

R. F. Loxton, B.Sc. (Soil Cons.) (Witwatersrand), Ifakara.*

W. G. Mathewson, B.Sc. (Agric.) (Aberdeen), D.T.A. (Trin.), Utete.

R. Frank, B.Sc. (Agric.) (Leeds), D.T.A. (Trin.), Iringa.

D. V. Chambers, B.Sc. (Agric.) (Dunelm), Lindi.*

J. Russell, B.Sc. (Agric.) (Belfast), Dodoma.*

*Served with Forces.

Agricultural Officers:

N. R. Fuggles-Couchman, B.Sc. (Lond.), Dip. Agric. (Cantab.), A.I.C.T.A., Ilonga.*
 J. Sinclair, B.Sc. (Lond.), M.Sc. (Dunelm), Mwanza.*
 M. H. F. Cooper, B.Sc. (Agric.) (Natal), Mbulu.
 D. R. Brewin, B.Sc. (Agric.) (Dunelm), D.T.A. (Trin.), Musoma.
 B. R. Tarr, B.Sc. (Agric.) (Stellenbosch), D.T.A. (Trin.), Morogoro.
 C. L. Norman, B.A. (Cantab.), Lyamungu.
 A. McCallum, B.A. (Cantab.), Musoma.

Plant Physiologist:

E. C. Diekmahns, B.Sc. (Glasgow), Dip. Agric. Sc. (Cantab.), Ngomeni.*

Tobacco Officers:

J. H. McGregor, M.B.E., Biharamulo.*
 J. M. Szymanski, Dip. Agric. (Wilno), Ngwina (Songea).*

Agricultural Officers (Ginnery):

E. Drakley, Mwanza.
 D. G. Firth, Morogoro.

Beeswax Officer:

F. G. Smith, B.Sc. (Forestry) (Aberd.), Tabora.*

Assistant Beeswax Officer:

S. W. G. Hubbert, Songea.

Fisheries Officers:

G. J. Lockley, Kigoma.*
 R. E. Gould, Korogwe.*
 E. H. O. Martin, M.A. (Cantab.), Dar es Salaam.*
 D. J. Watson, B.Sc. (Aberd.), Korogwe.

Superintendents of Agriculture:

A. A. E. Weirich, Moshi.
 R. B. Silcock, M.B.E., On leave.
 T. J. Taverner, Tengeru.

Master Fisherman:

K. Stather, Dar es Salaam.

Mechanical Foreman:

G. H. Bate, Tengeru.

Agricultural Assistants:

E. Pienaar, Masasi.*
 A. E. Favell, Bukoba.*
 F. Parke, Ilonga.
 D. H. Thwaites, Maruku.
 T. W. H. Dore, Tanga.*
 D. Shepstone, Kahama.
 L. J. Lloyd, Kisarawe.
 P. G. Lewis, M.M., Moshi.
 V. Allen, On leave.*
 J. C. Van Schoor, Sumbawanga.*
 W. E. Yeo, Arusha.
 D. R. A. Goode, Kondoa-Irangi.*
 J. F. Tregarthen, On leave.*
 R. Simpson, Ngomeni.
 A. M. Pienaar, Arusha.*
 J. I. Thomson, Lyamungu.*
 E. Hall, Same.
 G. L. Goodhew, A.I.B.A.E., Ilonga.
 R. C. Faun, Mbeya.*
 V. C. Allen, Maswa.*
 K. H. Groves, Lyamungu.
 R. C. Flint, On leave.
 L. B. Neary, Bagamoyo.*
 J. M. Van Dyk, Mhenge.*

R. F. A. Clark, Mgeta.*
 D. D. Bleasdale, Shinyanga.*
 H. G. Tomkins-Russell, Mafia.*
 W. J. H. Le Bechee, Newala.
 T. Drew, Tengeru.
 C. Decker, Mwanza.
 J. Jones, Mgwina.
 J. E. Gardner, Kisoma.
 W. I. Kerr, Kilosa.
 J. C. de Chazal, Tunduru.
 R. G. Foreman, Chambezi.
 B. E. Sherred, Mtwara.
 B. D. Bugden, Tengeru.
 R. J. D. Bruce, Kongwa.
 H. E. Hubbard, Mahenge.*
 R. A. Brown, Ukiriguru.*
 W. I. Reece, Tabora.
 F. W. Jollands, On leave.*
 J. T. Leach, D.F.C., On leave.*
 H. W. Stubbings, Kwimba.
 A. J. R. Jenkins, On leave.*
 D. F. Phillips, B.Sc. (Agric.), (Reading),
 On leave.*
 E. J. Richards, On leave.

*Served with Forces.

Agricultural Assistants:

A. Jackson, Mahiwa.
A. Priestner, Songea.*
J. Little, Mwanza.
S. D. Pyman, Tukuyu.*
W. J. V. Jones, Ngudu.
J. M. Ainley, Handeni.
B. J. Lumby, Njombe.
M. J. Routh-Herdon, Mwanza.
J. R. Bellamy, On leave.
S. M. Clarke, Matombo.*
H. E. Dickenson, On leave.*
H. H. Sharpin, On leave.*
M. E. Sacre, On leave.
A. W. Thompson, On leave.*
D. C. Randall, D.C.M., On leave.*
R. Duncan, Ukiriguru.*
D. Richards, On leave.*
W. D. Buchanan, Ukiriguru.*
K. W. E. Bindloss, Shinyanga.
G. W. Edwards, Moshi.

J. Papps, On leave.
P. E. Chaplin, On leave.*
R. J. Newbury, Morogoro.*
C. L. P. Heath, North Mara.*
J. W. Packard, Ngomeni.*
J. Weir, Iringa.
G. S. Sherriff, Kigoma.*
J. Lewton-Brain, Kilosa.*
J. Macer-Wright, Nassa.
D. Bullen, Maswa.
P. S. Hogg, Kasulu.
A. J. Krieg, Mwanza.
D. S. Taylor, Shinyanga.
R. A. Pollard, Mkuyini.
M. J. Simmonds, Mahiwa.
W. V. Larkin, Ngara.
G. C. White, Geita.
D. M. G. Bird, Mahiwa.
E. C. Green, Lushoto.
T. W. G. Howells, Biharamulo.
M. Jenner, Ukiriguru.

Soil Conservation Officers:

T. H. Evans, Tengeru,
J. D. Evans, Tengeru.

Entomologists' Assistant:

Miss C. A. Blair, B.Sc. (St. Andrews), Morogoro.

Education Officers:

J. Heberton, B.Sc. (St. Andrews), Ukiriguru.
T. K. Parry, B.Sc. (Agric.), Dip. Ed. (Newcastle), Morogoro.

Temporary Scientific Assistant:

Mrs. M. Wallace, B.Sc. (Lond.), M.Sc. (Lond.), Lyamungu.

Secretary:

R. F. Le Duc, B.Sc. (Agric.) (Dunelm), B.Sc. (Pure Science) (Dunelm), Dar es Salaam.

Chemist:

L. J. Hart, B.Sc. (Lond.), D.T.A. (Trin.), Lyamungu.

Horticulturist:

L. M. Fernie, Lyamungu.

Office Superintendent:

Mrs. K. M. Craufurd-Benson, Dar es Salaam.

Junior Agricultural Assistants:

I. B. W. Friend, Mpanda.
A. D. P. Angelini, Ukiriguru.

Stenographers:

Miss S. E. Bailey, Dar es Salaam.
Miss A. M. Pollard, Arusha.
Miss M. S. Taylor, Mwanza.
Miss D. O. Bayley, Mwanza.
Mrs. P. Senior, Dar es Salaam.

Mechanic:

G. V. Gaffney, Lyamungu.

Executive Officers: District Production Committees:

B. G. Ellison, Moshi.
C. W. Manton, Iringa.

*Served with Forces.